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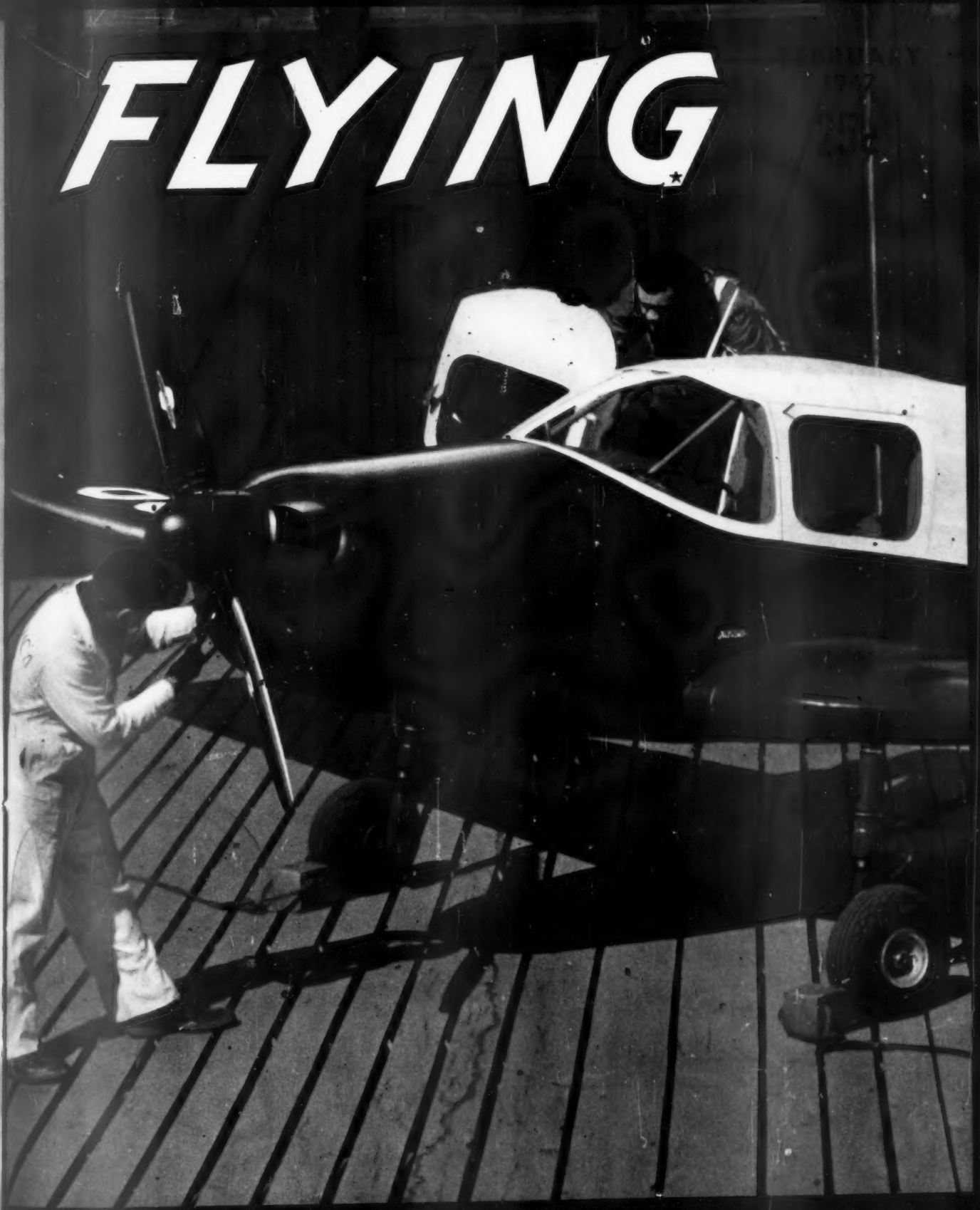

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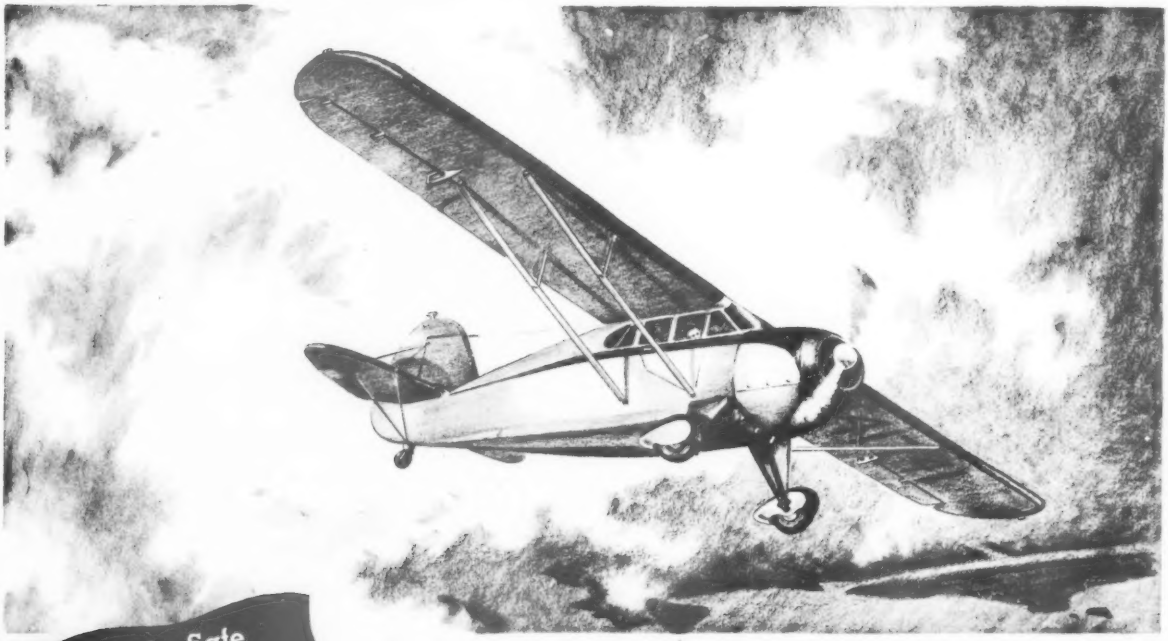
Spin Resistance Built In..



It Looks Safe
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IT IS SAFE

Announcing the New FUNK B for 1947

FEATURING: Low Noise Level — comfortable conversation in full flight.
Roomier Cabin — more leg room, more luxury.
Dual Hydraulic Brakes — for even greater safety.
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YOU WON'T SPIN IN, IN A FUNK. The spin has been engineered out of the Funk as an accidental factor. Engineered stability assures you of non-stall, spin-resistant characteristics — a new experience in fleet, carefree flight. Landings are extremely safe at Funk's low speed — 37 MPH, unaffected by gusty winds. Runway worries are gone due to Funk's low center of gravity. The Funk hugs the ground through sharp turns and gusts of wind. New safety and pleasure are yours in the new Funk B.

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Standard equipment: Electric Starter and Generator, Radio, Landing Lights, Wheel Pants, Wool Upholstery, Door Locks, Complete Cabin Insulation to Eliminate Noise, and a Baggage Compartment of Approximately 10 Cubic Feet

FUNK FACTS

Model, Funk B-85 (HP) C (Continental); Two-place side-by-side; Wing Span, 35 ft.; Length, 20 ft., 1 in.; Height, 6 ft., 1 in.; Take-off, 350 ft.; Fuel Consumption, 5 gal. per hr.; Cruises at 100 MPH.

FOR FURTHER INFORMATION ON THE FUNK B AND FLYING THE FUNK B, WRITE DEPT. F-122

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COFFEYVILLE, KANSAS

Now rubber makes it hot for ice

AIRPLANE propellers were asking for trouble as they whirled through the air in certain weather conditions. Their leading edges, biting into supercooled moisture droplets, quickly gathered ice—thrust was not maintained, and full engine power wasn't available. Now B. F. Goodrich has developed a heated rubber shoe that concentrates warmth where protection is needed.

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Besides the cold weather advantages, these B. F. Goodrich rubber "skins" on exterior accessories offer excellent abrasion-resistance... sturdy protection against sand, pebbles, cinders, and the eroding effects of rain—especially important to propellers. Perhaps heated rubber can help you. For facts, write to *The B. F. Goodrich Co., Aeronautical Division, Akron, Ohio.*

B.F.Goodrich

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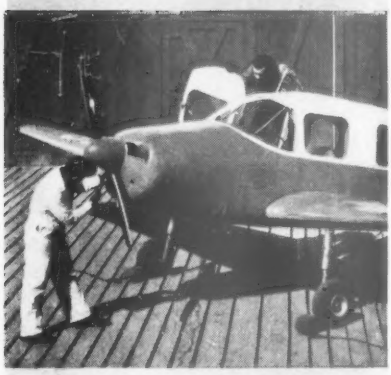

THE COVER: Readying a Bellanca Cruisair for test flight at the company's factory.

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FEBRUARY • 1947

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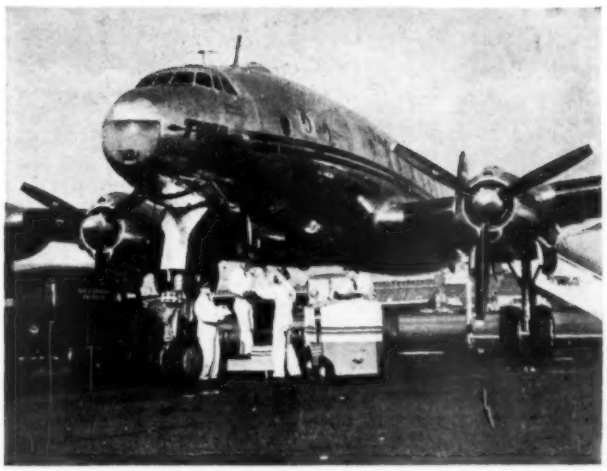

Some of *TWA*'s 13,000 employees loading a Constellation Skychief—one of the fastest passenger planes in the world.

Phillips 66

AVIATION GASOLINE

HANGAR FLYING

LOCKHEED

Hummingbirds vs. Constellations

Hummingbirds, who hold the record, can fly 600 miles without refueling. And it doesn't take a John J. Audubon to figure out that hummingbirds are probably pretty tired cookies when they land. But the *Constellation*, no slouch itself when it comes to records, can now fly more than 4000 miles nonstop without even breathing hard—thanks to its new long-range wing.

The wing adds about a thousand miles to the plane's range. An extra tank inside each of the two outer wing panels increases gasoline capacity by over a thousand gallons—with a weight

increase of only 600 pounds (exclusive of the gas, of course).

And, according to certain cabalistic signs which engineers love to make on graph paper, the payload of such *Constellations* is doubled in the latter stages of a flight. Money in the bank.

Adding another thousand miles to the long-range *Constellation* may sound like gilding the lily. If that's what it is, Lockheed spends an important part of its time lily-gilding—constantly making the *Constellation* a better plane. And making better hangar flying, too.

L to L for L

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LETTERS

TESTED FIRST JB-3

On page 100 of your December issue is a photograph of an A-26 with a JB-3 mounted under its left wing. It was with no small measure of surprise that I looked upon the very airplane and missile that I flew on the initial tests. The JB-3 shown in the picture is painted No. 1, since it was the first ever to have been launched and flown.

That test flight proved very interesting. A camera mounted under the left wing outboard of the bomb rack (visible in picture) caused an aileron flutter and a measurable loss of lift on that wing at the necessarily high launching speed.

I was operations officer for the unit testing this type of missile as well as many other types. The organization of such missions and tests was no small problem. For example, it took a total of four aircraft in the air, in addition to the many technical observers and photographers on the ground, to obtain information required on the JB-3 launching. Timing had to be perfect and it took much practice and many dry runs before each plane was in its proper position.

Thank you very much for printing this picture. It helps me explain to some extent my activity in the service which has been shrouded in secrecy.

PHILIP G. MACK, JR.

Tulsa, Okla.

WANTS TWO-ENGINED LIGHTPLANE

I fly my own *Ercoupe*, NC 2769H. Can you tell me how long it will take the aircraft industry to wake up to the tremendous sales appeal and safety of a lightplane with two engines of not over 65 h.p. each?

The Commonwealth *Trimmer* is on the right road, but with two 85's it is still above the average businessman's pocketbook. Many businessmen today are staying on the ground because of the possibility of a failure of one engine, as remote a possibility as that may seem. Many men will pay a big premium for a two-engined plane (that is really in the lightplane class) that will at least maintain altitude on one engine. The industry is missing the boat.

JOE WILLIAMSON, JR.

Daytona Beach, Fla.

● It won't be too long now.—ED.

NOTE ON THE CULVER "V"

Your article on the Culver "V" (September issue) was well worth reading. It makes one itch to get in the "V" and find out if it is really as much of an advance as reported.

There appears to be some mistake with respect to the "anti-stall" strips to which you refer in the caption of one of the pictures and in the text. The raised strip along the leading edge of the center section would be more accurately termed a stall strip.

It's really sort of an automatic spoiler, which has little effect when the wing is at normal angles of attack. They cause the roots to stall first—while the tips are still flying—thereby assuring better lateral control characteristics in the stall. Another name for them is "spin strips." Some designers achieve the same effect by washing out the wing tips so that the tips always have a lower angle of attack than the root, and therefore are the last to stall.

ALLEN W. HAYES

Ithaca, N. Y.

"JUNIOR GI's"?

I enjoy reading "Report from Washington" but when I read the write-up in the December issue on the AAF ROTC, I got sore. Where do they get that "Junior GI" stuff? I'm taking the course here at old Missouri—and let me state here and now that every one in my class has seen at least a year's combat. To be eligible to enter the course, one of the requirements is two years previous service. Junior GI's, Ha!

The article also stated that we lucky boys would have the thrilling experience of eight weeks of real camp. Thrill, thrill. That one little requirement is going to knock a whole semester out of the minimum time required for us married men to finish our education. I know there's a word for it, but $20 a month extra can help a couple squeeze through without robbing a bank. Barely, that is. Here's hoping that subsistence is raised soon.

G. J. RAYMOND

Columbia, Mo.

WEASEL IS A JEEP

In a "Have You Seen?" (November issue) you said a surplus Weasel was used by the Queen's seaplane base. According to the picture, it was not a Weasel but an amphibious jeep. A Weasel has tank tracks while a jeep has wheels. You will note in the picture there are wheel wells.

ELLWOOD W. LIPPINCOTT

Centralia, Wash.

MOUNTAIN FLYING

I enjoyed and profited by your article "How to Fly in Mountains" by Maj. William D. Madsen (November issue), but wish to discuss a point which I believe to be erroneous.

The major, when referring to approaches to high-altitude landings, says "They likewise will glide at a steeper angle although with the same attitude." I believe that an approach at high altitudes should be made at the same indicated airspeed as at sea level; this will give the

(*Continued on page* 94)

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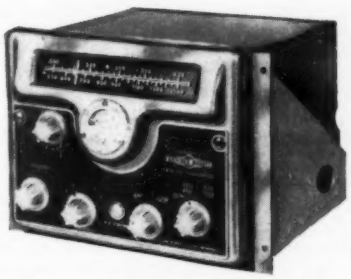

Complete, 2-way radio package which combines in one unit: 1. V.H.F. 5-channel transmitter with range up to 75 miles, requiring only a 24" rod antenna. 2. Medium frequency range and broadcast receiver with connection for direction finder loop. 3. Internal power supply for receiver and transmitter. Dimensions of unit behind panel: Depth 6¾"; width 6⅝"; Height 5⅛". Weighs only 8 pounds complete, with shockmount.

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. . . About the paper shortage? That explains the varied grades of paper Flying has used recently. We expect that better paper in the near future will permit us to return to the uniform high-quality stock which has always been one of the hallmarks of Flying's excellent publishing job.

. . . **German spotters could locate planes 12 miles away** with uncanny accuracy toward the close of World War II. Detection was effected through reaction of infra-red rays to heat of engine exhaust. Wright Field engineers say the device used proves Germany was further advanced than any other nation in knowledge and use of the invisible ray. Another illustration: the German gadget which corresponded to the American "sniperscope" had a range of 328 yards —more than five times that of the American device.

. . . **JATO soon may be paired with JAB** in aviation's abbreviated vocabulary. If so, JAB will stand for Jet-Assisted Brakes. Aerojet engineers simply reversed the mounting of JATO (Jet-Assisted Take-Off) units on Skytrains and Skymasters and on a few basic trainers to test their efficiency as a braking aid in landings. Results have not been released at the time of this writing. . . . Secrecy also currently surrounds another jet project—the flight testing of France's first jet plane, the Leduc 0-10.

. . . **Push-button insurance** is one of the latest services provided airline travelers. Write a few words, insert a quarter, push a button and the Insurograph machine issues a $5,000 accident policy. Approved by insurance commissioners in many states, the device relieves airline personnel of sales responsibility.

. . . **Gargantuan service docks** have been designed by Trans-Canada Air Lines engineers to match the size of the new DC-4Ms TCA will soon fly. Height of the planes makes conventional service facilities useless.

. . . **Call it the "Sacred Cow" if you like,** but to the President his private plane is simply "The C-54." ATC personnel gave the plane its unofficial tag in India where they had learned about the zebu, a sacred bull. But hundreds of American citizens stormed their protest against use of so flippant a term, forcing the President to delete the words from the official vocabulary.

. . . **Modern hieroglyphics speed cargo handling** for Trans-World Airlines. A system of stenciling packages with symbols representing cities along TWA's international route has been devised—Statue of Liberty for New York, the Sphinx for Cairo, etc. Coupled with initial letters of the cities, the system permits destination checks at a glance.

. . . **Latest model of the Superfortress,** tagged the B-50, will be stronger, faster and longer-ranged than the B-29. Retaining the same general appearance as its prototype, the new aluminum alloy used on the B-50 makes it both stronger and 651 pounds lighter. Pratt & Whitney engines equipped with jet exhaust stacks give it 59 per cent more power than the B-29. Equipped to withstand climatic change involved in flight to any spot on the globe, 133 of the new planes have been ordered by the AAF. They'll be completed soon.

. . . **Add a dash of salt to British claims** of superiority in the field of jet propulsion says Leonard S. Hobbs, vice-president-engineering for United Aircraft Corp. Turbine power plants, he asserts, will not be used in air transportation for at least five years and will not replace piston engines for at least 10 years. And Hobbs will cite you production figures that indicate U. S. turbine developers will overcome any lead which the British now enjoy in less than half that time.

. . . **U.S. turbo-jet development will be speeded** by completion of the $3,500,000 laboratory at Toledo, O. It will be finished by spring. In the meantime, a new turbo-jet engine is getting finishing touches at the Packard plant at Willow Run, Mich. The new engine, which will be adaptable for use on both aircraft and missiles, is still on the restricted list—but designers seem highly pleased with the progress they have made.

. . . **There'll be no more eye refraction tests** for potential commercial pilots says CAA Administrator T. P. Wright. Discontinuance of the tests was recommended by the Committee on Medical Problems of the National Research Council on the ground that they are not necessary to public safety.

. . . **Location of the North Magnetic Pole is in error,** reports the crew of the B-29 "Dreamboat." They placed the pole approximately 200 miles from its previously computed location during their recent flight from Hawaii to Cairo via the Polar wastes. The error was originally noted by the crew of the RAF Lancaster "Aries" during a Polar flight made last year. END

Gleam in the Eye of a Navy Cadet

From the moment a Navy flying cadet arrives at his flying field barracks, his eyes and his heart are on "the line."

For there rests his first love, the plane in which he will learn many of the precise and efficient practices of Naval Aviation.

A new plane for "the line" at Naval training stations has flown its first tests—a primary trainer that looks and "feels" like the shipboard fighters some of the cadets will eventually fly.

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Careful research and engineering skill mark the XNQ-1, as they mark all Fairchild products, with "the touch of tomorrow." These engineering skills won for Fairchild the XNQ-1 contract in a competition among the nation's topflight designers—a competition sponsored by the Navy's Bureau of Aeronautics.

XNQ-1 Navy Specifications

Tandem, 2-place, low-wing, all-metal monoplane.

Flaps, retractable landing gear.

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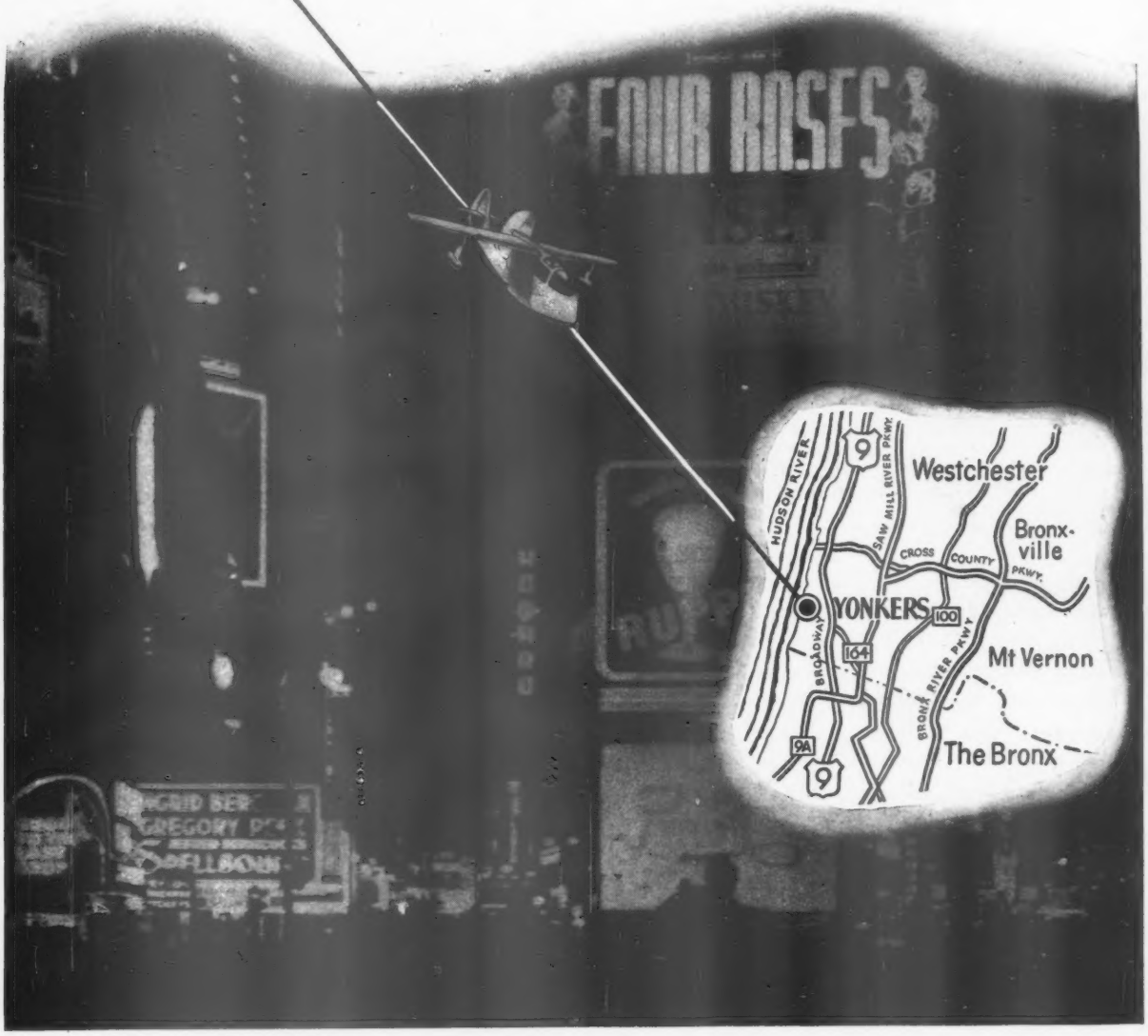

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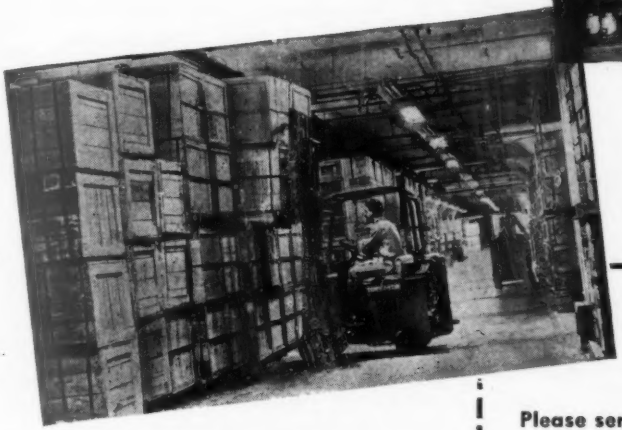

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"Esso is in step with the times"

Says **Findley Wilson**
New Castle Airport, New Castle, Pa.

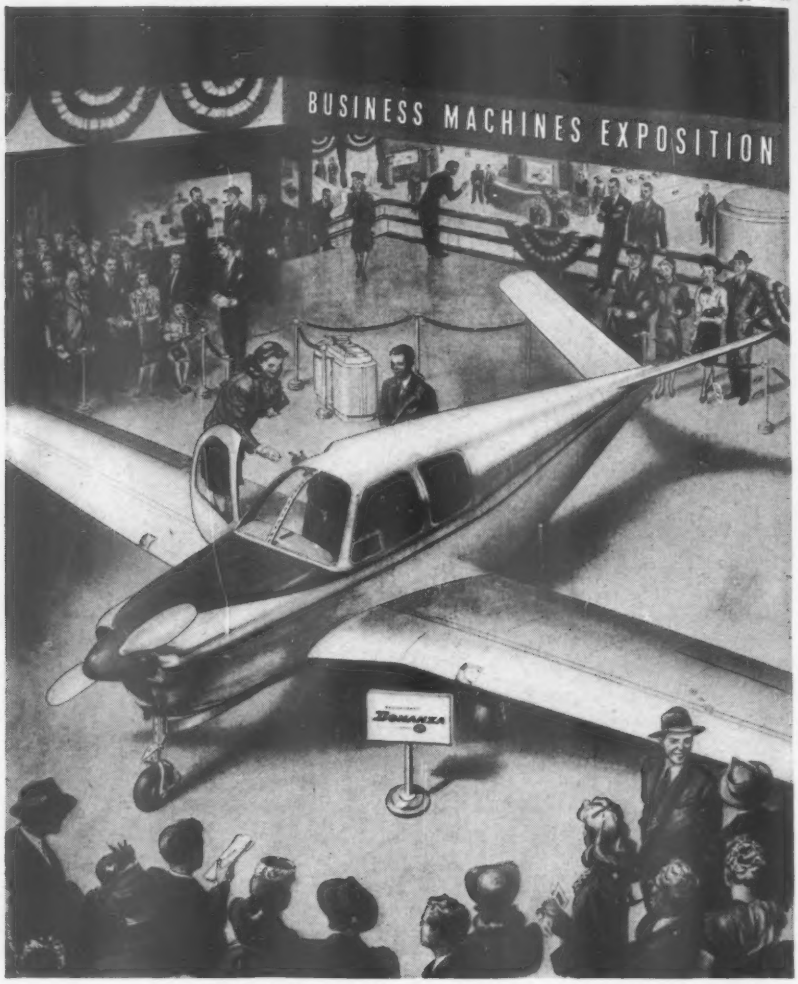
MR. FINDLEY WILSON, owner of three airports in Pa., has been a part of aviation's growth since 1919. He has taught flying for the past sixteen years, and during 1943-1944 he and his wife trained over 3000 Army and Navy pilots. They are operating two schools at present.

Regarding equipment recently installed by Esso Marketers at his New Castle Airport, Mr. Wilson writes: "Esso's policy was, 'We will pioneer the field with you.' Later, when we started another new airport, Esso was right on the job. We feel this Esso policy is right. Esso is in step with the times!"

Yes, Esso's willingness to serve Aviation Dealers like Mr. Wilson and cooperate with them wins new friends for the Esso Wings continually. High-quality, dependable Esso Aviation Products backed by over 40 years' aviation experience, dating from Wright Brothers' first flight at Kitty Hawk, have earned the respect of dealers and flyers alike!

YOU CAN DEPEND ON

NO. 14 IN THE SERIES FEATURING PROMINENT ESSO AIRPORT OPERATORS



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Look at the Beechcraft

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• *Top Speed, 184 mph; Cruising Speed, 175 mph; Landing Speed, 46 mph; Range, 750 miles*

WHAT'S a business machine for? To save time, save labor, save money, improve a product or service. The Beechcraft Bonanza qualifies as one of the most useful, efficient and economical business machines ever presented to American industry! And it not only does superlatively well the things required of a good business machine, but makes a new kind of executive out of the business man himself!

The Bonanza is a four-place, 175 mph business vehicle that brings travel costs to as low as one cent per passenger mile while providing limousine luxury and comfort to every passenger. You go when you want to go—in *any* direction. The plane is equipped for round-the-clock, round-the-season travel—two-way radio, landing lights, instruments, cabin temperature control. And it is as quiet as an open car on the road at 55 mph!

The Bonanza *had* to be a revolutionary plane to provide the utility demanded for business use. It *is* revolutionary, achieving a speed and payload with its **165 hp** engine and controllable propeller that no other plane has ever achieved before with less than 330 hp! Yet for this business machine—capable of saving thousands of dollars per year in man hours and executive efficiency and of making substantial savings in travel expense—the cost is just $7,345 F. A. F. Wichita, Kansas.

Production for early 1947 is already sold. Orders for delivery will be filled in the sequence received. There is a Beechcraft distributor near you, ready with additional facts and figures—and a Bonanza. Write for his name. Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

BEECHCRAFT

BONANZA

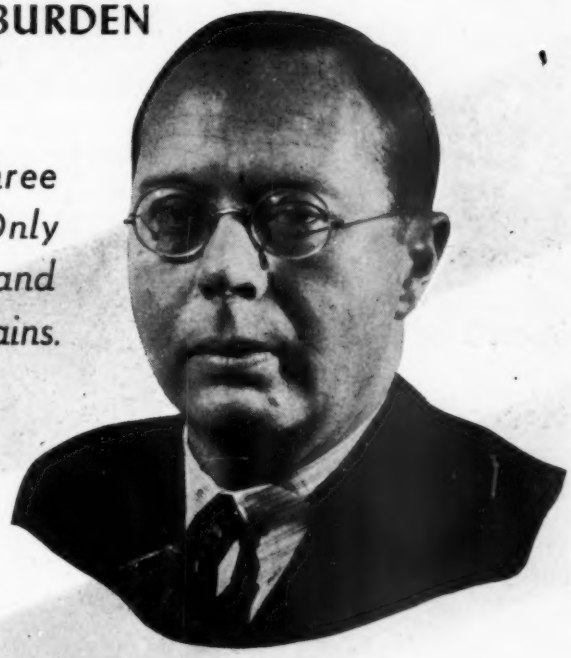
MODEL 35

Have We Been Too Optimistic?

Asks WILLIAM A. M. BURDEN

Assistant Secretary of Commerce for Air

Flying activities are three times the pre-war level. Only better planes, airports and airways can extend these gains.



William A. M. Burden

AFTER more than a year of unprecedented expansion the private plane business is ebbing. Thousands of backlogged orders for some types of aircraft have vanished. Some factories have closed. Others are cutting down. It is time to pause and take stock.

In retrospect the year 1946 has shown enormous advances. A year previously, the CAA estimated there would be about 42,000 registered airplanes by the end of 1946. All the returns are not yet tabulated, but actual registrations have reached more than 76,000!

Pilot registrations have totalled 360,000—three times the best pre-war year. The number of CAA-certified flight schools has almost tripled.

On this basis, we estimate that registered aircraft will total upwards of 125,000 by mid-1948 and the number of certificated pilots will rise to 430,000. If this comes about, our predictions of 1946 will seem conservative indeed.

But the present cutbacks show that this may be an error on the optimistic side, just as 1945's estimates erred on the pessimistic side. For the spectacular gains of 1946 had varied stimuli. A large part of them were due to the pent-up demand of four war years when no commercial planes could be built. Then there was the current temporary stimulus of flight training financed by GI educational funds. This has boomed not only the flying schools but has increased the market for training-type planes.

Today, however, we are seeing the deferred demand being satisfied in some personal plane categories and the stimulus of GI training flattening out. Planning will make it less severe and will be the better for aviation as a whole. If we are to continue the upward trend, we must make personal airplanes more useful. Personal plane designs will require rapid improvement. And there must be an expansion in the airport system.

An indication of how a set-back could develop into a major disaster for the industry and

AIRPORTS

Facilities added by the Federal airport program will help aviation, author says.

AIRWAYS

New blind-flying aids, like this light airborne radar, make the airways safer.

ENGINEERING

Bellanca static wing tests point to type of engineering needed.

for lightplane flying generally is the safety problem. At risk of exaggeration, it may even be the No. 1 problem facing us today. To put it another way, I predict that air safety will shortly become as fundamental a concern of this Government as highway safety is today.

In appraising air safety the public must remember that the total number of accidents or fatalities is not an accurate index for comparing one year's performance with another. In a period of rapid growth like the present, when each new year brings forth a 50 to 100 per cent increase in flying over the previous year, it is natural that the number of accidents will rise even though great improvements in unit safety are accomplished. The important thing to watch is the number of fatalities *in relation to volume of operation.* In the airline field this figure is usually given in terms of passenger miles flown per passenger fatality—theoretically the distance one can fly without the probability of being killed.

Measured on this basis the record so far in 1946 is over twice as good as in the same period in 1945 and as good as any year in air transport history. The domestic certificated airlines flew 80 million passenger miles per passenger fatality—the equivalent of 3,200 trips around the world—in the first nine months of this year as compared with 35 million in the same period of last year. Nevertheless this record is no better than that achieved in 1939. We must show a steady and rapid improvement—not merely hold our own.

The safety record of the non-scheduled contract or charter operators has been far from good. During 1946 they have had about 10 fatal accidents in cross-country flights. Four of these resulted in over 50 passenger fatalities. While this is virtually identical in numbers to the total fatalities on the regular certificated airlines, these nonscheduled operators flew only a fraction as many passenger miles as did the certificated operators. Their safety record on a passenger mile basis therefore is only fractionally as good.

Safety can also win—or alienate—hundreds or thousands of newcomers to lightplane flying. Every accident that spreads itself on Page 1 of your newspaper damages the future of flying comparably with the damage done to the pilots and passengers injured in the crash.

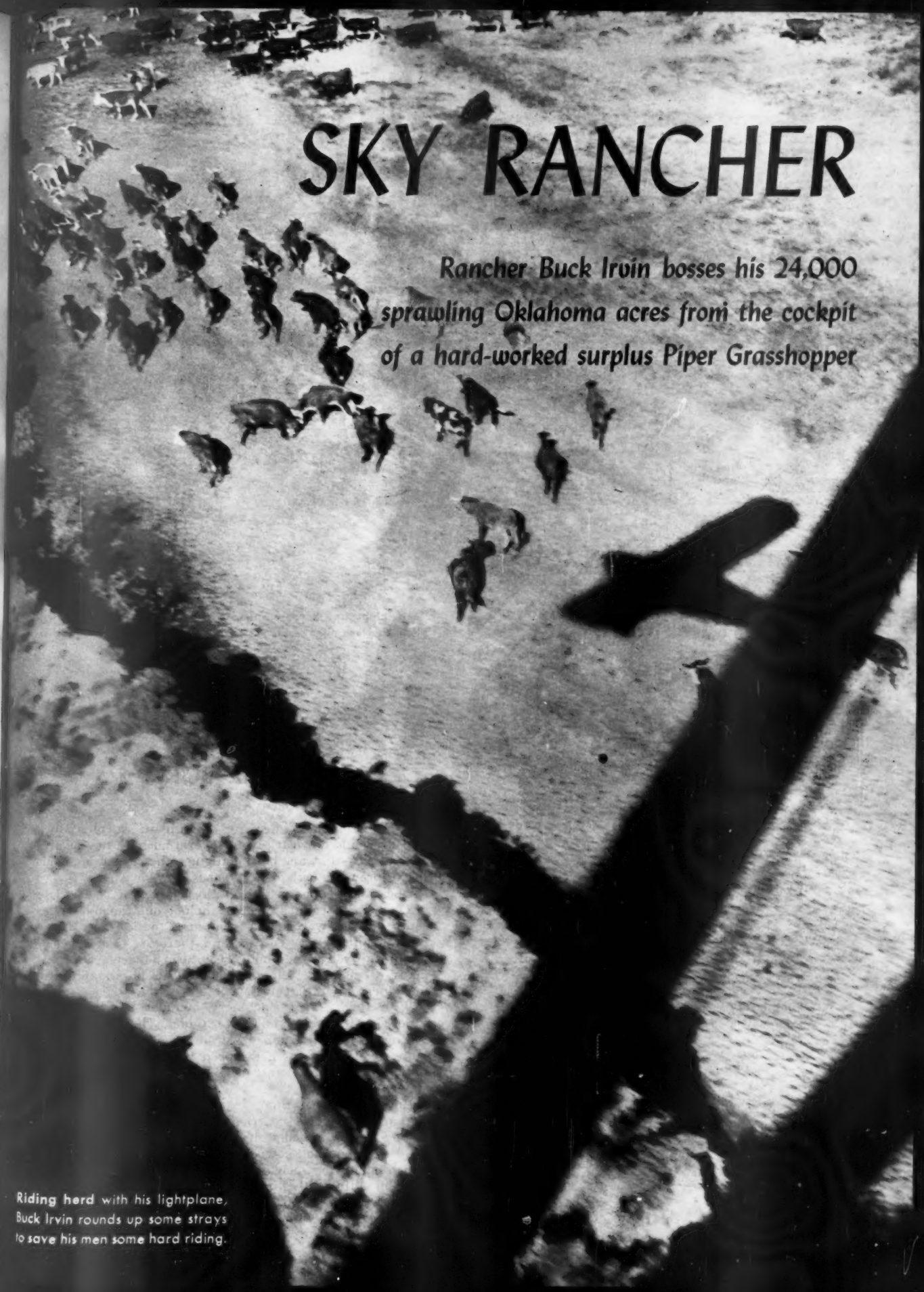
We therefore simply cannot consider that the same safety record which we had in 1939 to 1942 is satisfactory today. Even if we want to be complacent, the public, the newspapers, and the Congress will not let us be. The white heat of publicity is now turned on each airplane accident. If there is not a great improvement in the unit safety record, the number of fatalities will loom so large that life will be very uncomfortable for those in Government who are concerned with aviation. This will be true whether they are responsible for civil aviation or for providing the Civil Aeronautics Board and the Civil Aeronautics Administration with funds for modern air navigation facilities and effective enforcement.

No one, including CAB and CAA, wants stringent, complicated regulations. Simple regulations justly and quickly enforced are the ideal. The CAA today, with less than 200 inspectors, cannot fulfill its responsibilities in helping thousands of commercial operators to abide by safe flying practices. Responsibility for safe flying by hundreds of thousands of private flyers therefore is being turned over as fast as possible to state and city officials and designees employed by private aircraft service operators.

There is, however, a more immediate answer to the worst aspects of this problem—teamwork toward cutting accidents to an absolute minimum. CAA field workers have been instructed to push the safety program to the limit. In their turn they are instructing state and city law enforcement officials and CAA designees in the prevention of reckless and dangerous (*Continued on page* 97)

SKY RANCHER

Rancher Buck Irvin bosses his 24,000 sprawling Oklahoma acres from the cockpit of a hard-worked surplus Piper Grasshopper



Riding herd with his lightplane, Buck Irvin rounds up some strays to save his men some hard riding.

Jeep, plane and horse are used by Irvin who often carries a saddle in his plane when he expects to ride a horse on one of his ranches.

Pilot Irvin checks the oil in his war-surplus plane before taking off to aid cowhands in annual roundup.

By MAX BURK

IF THE Army hadn't declared a lightplane surplus, Buck Irvin would be wearing out several horses a day or giving a pick-up truck battle fatigue as he superintends his three sprawling Oklahoma ranches.

Buck and his dad, a retired physician, own 24,000 acres of Oklahoma. Their properties include one ranch 30 miles south of Woodward, Okla., another 25 miles west and a third 90 miles west. Of this land, there are 6,000 acres of wheat and range for about 2,000 head of beef cattle. It takes foremen and helpers plus plenty of horses and farm machinery for the operation.

With Buck, farm machinery includes a war-surplus Piper *Grasshopper* and a Culver *Cadet*. The surplus plane is a flying pick-up truck, observation post and aerial cowpony. The Culver is high-speed transportation to cattle buying and selling points of Old Mexico and neighboring states.

How does a war-time *Grasshopper* work on a ranch? As a pick-up truck it carries anything—man or mineral—loaded into it or tied to its fuselage. At round-up time, the horse-mounted cowboys inevitably miss a few strays which cannot be seen from the ground and Buck brings them in with a little fancy buzzing.

Fence riding was one of the most boring jobs of the Old West. Cowboys with several days' grub strapped to their saddle cantles rode along the fence doing repairs as they

Corrals which will be used to ready cattle for shipping are quickly checked from the air before round-up of range-fed herds begins.

Buzz job is effective in driving stray steers toward water tank where they later will be picked up by cowhands mounted on horseback.

Ranch hands in pick-up truck are spotted by Irvin. Landing on road in front of truck, he stops them and gives necessary instructions about their next job. Irvin's lightplane has a 75-h.p. engine, but otherwise is quite similar to an ordinary Cub.

Checking cattle drive, Buck flies low over a herd trailing along dried-up stream bed. From the air he can spot cattle breaking away from main herd better than a man on horseback and can give his round-up foremen other time- and labor-saving assistance.

Home every evening, Buck enjoys far different life from the old-timer who was gone for weeks during roundup.

found them. Buck flys the fence lines of his three ranches in a fraction of the time required by a man on horseback, lands and fixes breaks whenever he spots them. It's the same deal with windmills and ailing cattle. Buck covers more territory than the old-time cowboy—and faster and cheaper.

The airplane comes in handy, too, when Buck and his wife go to town on shopping trips. Actually, the ex-*Grasshopper* is the second family car with everybody taking a hand in the flying—even Buck's six- and seven-year-old kids. The missus plans to take flying lessons soon. When that happens those lightplanes probably will be put to social uses as well.

When not flying, Buck Irvin resorts to his jeep or command car. These olive drab war veterans can haul him places inaccessible to the conventional automobile or truck.

Only on rare occasions do the planes, the jeep and the command car stay at home while Buck rides a horse. END

Well piping is needed by a drilling crew 25 miles away. Buck lashes 22 feet of two-inch pipe to landing gear and tail wheel, flies it to them.

All-important water is obtained by use of windmills spotted throughout range. Windmill above is okay; but finding another which isn't (below), Buck lands and climbs tower to make the repairs.

Round-up over, Buck lands near ranch corral and supervises the separating of cattle brought in during day's drive.

Test Pilots' Academy

British instruct selected pilots from the Allied Nations in 'world's most exclusive flying school.'

By CHARLES E. BROWN

British photographer-journalist

BASED at Cranfield Airdrome, 50 miles north of London, is one of the world's most exclusive flying schools. Despite the warning of Royal Air Force operators that its training requirements are the toughest yet, pilots from all over the world are clamoring to be enrolled—but few can meet entrance requirements, or raise that $40,000 tuition fee. Besides there's a quota of only 30 students per course, necessitated by the person-to-person character of the training.

Test-pilot graduates of the intensive, nine-month course have learned to fly everything the British have to offer, from a glider to a 600-m.p.h.-plus jet. Ground training has enabled them to evaluate precisely the performance of any plane which their sponsors—usually aviation firms or military units of the Allied Nations—want tested.

Initiated early in 1943 when the British realized that it takes more than just a good pilot to test-fly a plane, instruction is based on the fact that modern planes are complex gadgets. Highly specialized skills required for the month-after-month routine of maintenance testing are not produced by mass training techniques.

Expense of the course, therefore, is high. Producing the sort of test pilot needed requires super instructors and a fleet of test planes which includes every military type. Such training requires a long time because students not only have to check out for flying the many types of planes, but they have to know what makes those planes work—their construction, engines, performance.

They have to be an exceptional lot, these students, not the show-off boys we sometimes mistakenly believe test pilots must be; but cool, competent pilots. Standards are high and exacting. Applicants must be in tip-top physical shape. They must have at least 1,000 flying hours and be rated better-than-average pilots. A good mathematical

Cranfield Airdrome is base for RAF school. Here students fly every type of British plane while learning new test-piloting techniques.

Flying classrooms for the student test pilots include (top to bottom) a de Havilland Mosquito, an Avro Lincoln, a Hawker Tempest, a Supermarine Spitfire, a Gloster Meteor, and a de Havilland Vampire.

Class drills on mathematics and aerodynamics give pilots skill in diagnosing any aircraft ill. Note student in civilian dress.

Cockpit checkout study is made by pilots from U. S., China and the British Empire. The plane is a Supermarine Spitfire 22.

TOP PILOTS FROM ALL PARTS OF THE GLOBE ARE ENROLLED IN THIS RAF SCHOOL

China's Lieut. Shong Ching Lu studies gyro with Sqd. Ldr. C. B. Brown.

Royal Navy's Lieut. T. J. A. King-Joyce works out classroom problem.

Greece's S/Ldr. M. Kondolefas (left) chats with U. S. Navy's W. P. Smith.

RAF's Wing Comdr. M. E. Blackstone studies the Seafire's flight manual.

Australians J. C. Miles and S/Ldr. K. V. Robertson study instruments.

background is a "must," plus common sense, tact, and patience. And these are only the basic requirements.

Originally directed by Wing Comdr. Sammy Wroath, it was dubbed the Empire Test Pilot's School. Under his command and that of his successor, G/Capt. H. J. Wilson (who won the world air-speed record), the school came to be known as an international authority on test piloting.

The project now comprises far more than just an RAF school. Usually there are at least two U. S. Army or Navy men, as well as men from other Allied air forces and from all the British colonies—all are learning to do a better test-pilot's job for their governments. END

Instructors and students at Cranfield pose before de Havilland Vampire. They are (left to right) F/Lieut. D. J. P. Broomfield, RAF; J. C. Miles, Australia; F/Lieut. J. F. Fewell, RCAF; Lieut. A. B. Sinclair, RN; G/Capt. H. J. Wilson, RAF; Wing Comdr. R. L. Smith, RAF; F/Lieut. B. Bastable, RAF; Lieut. King-Joyce, RN; Col. J. J. Stone, AAF, and Lieut. R. B. Giblin, USN.

THE CASE OF THE Unwanted Airport

By

FRED HAMLIN

Disgruntled neighbors tied this airport project up with legal knots that make an interesting case study.

Test-case defendants, Chief Instructor Mumma (top) and Airport Owner Krader study map of disputed area.

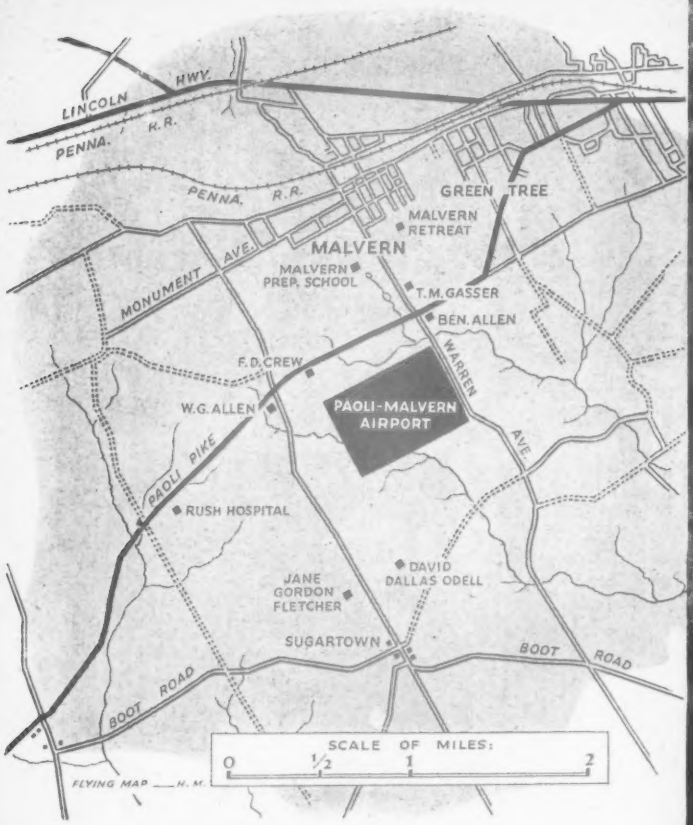
DON'T plan to open a small airport this spring unless you have the fullest support of the surrounding community. Why? The odds are that, without that support, you're in for trouble.

In any event those are the hard facts revealed in this "Case of the Unwanted Airport," the Paoli-Malvern project in the suburbs of Philadelphia. It's a timely case study of difficulties which may confront anyone contemplating a similar project.

The story begins pleasantly enough. In November, 1945, Maurice R. Krader, a Philadelphian, decided to open a field in the city's suburbs. He first enlisted the support of John L. Mumma, an old CPT instructor who had logged some 4,000 hours. Knowing from experience that the airport site itself might mean the difference between success and failure, they spent a lot of time selecting a location. They finally decided on a 193-acre plot near both Malvern and Paoli, two communities in the heart of Philadelphia's famous Main-Line estate area.

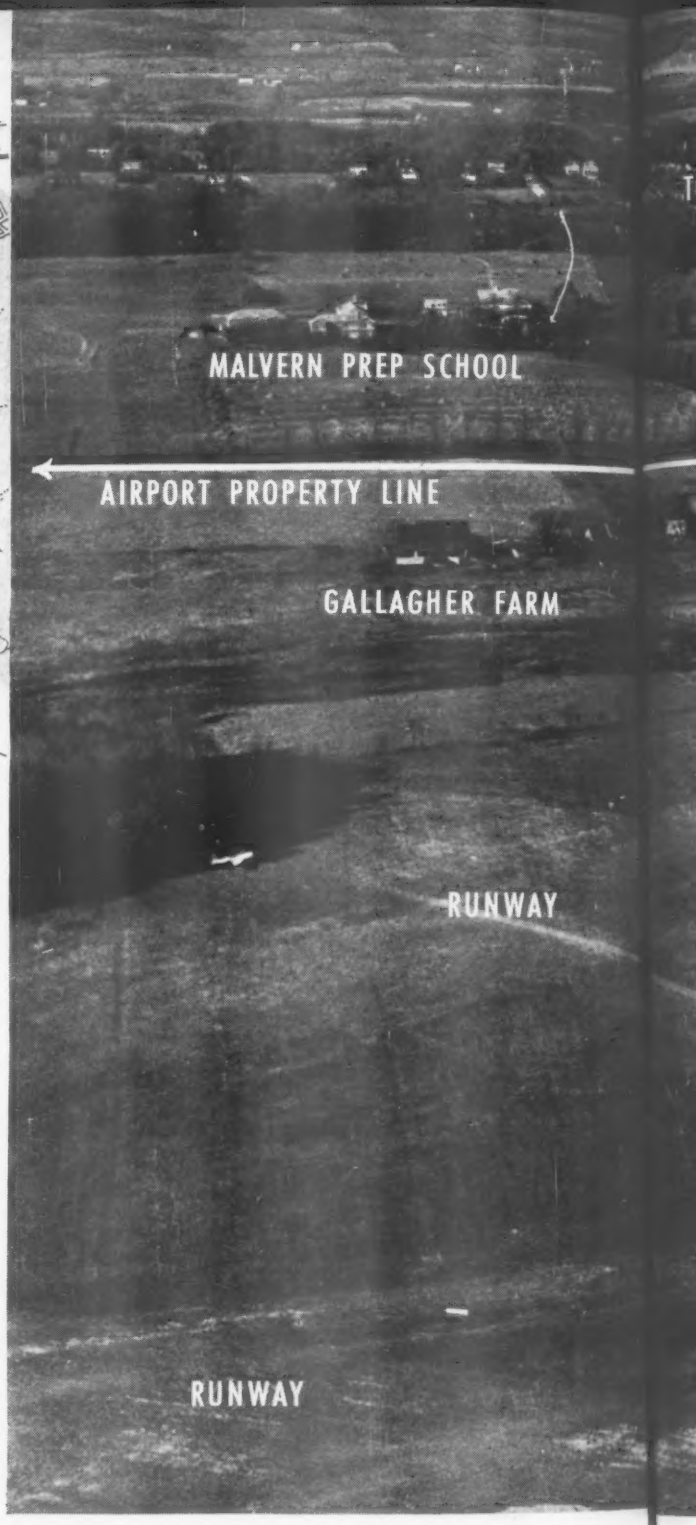
Work on the site began early last spring. John MacFarland, supervising inspector for the Pennsylvania Aeronautics Commission, which is dedicated to a program of promoting small airports, approved the Malvern-Paoli site and, after an east-west runway was cleared, dropped in from time to time to see how things were going and to offer encouragement and advice. Krader and Mumma began to do a little flying, too—in a Piper *Cub* and a Fairchild. A couple of Army trainers buzzed the field and the surrounding area, something that Krader didn't like. He and Mumma agreed that when they went into operation they would discourage stunt flying; but the trainers didn't appear frequently enough to disturb them, and they were busy with plans for hangars and customers.

Supply shortages forced them to postpone building hangars, but the prospect for customers looked good. A young Army veteran, Joseph O. Fulton, Jr., who had flown a *Mustang* on 63 fighter missions over Germany, showed up and expressed great interest in the field. He followed this by organizing the Veterans Air Park Association to promote flying and flying jobs among veterans



TEST-CASE TROUBLE ZONE

Location of the 193-acre Paoli-Malvern Airport is shown on map above. The two communities from which it derives its name are in the heart of Philadelphia's Main-Line estate area. Photo of the port and its environs (at right) is labeled to show properties whose owners or operators were principals in the test case.



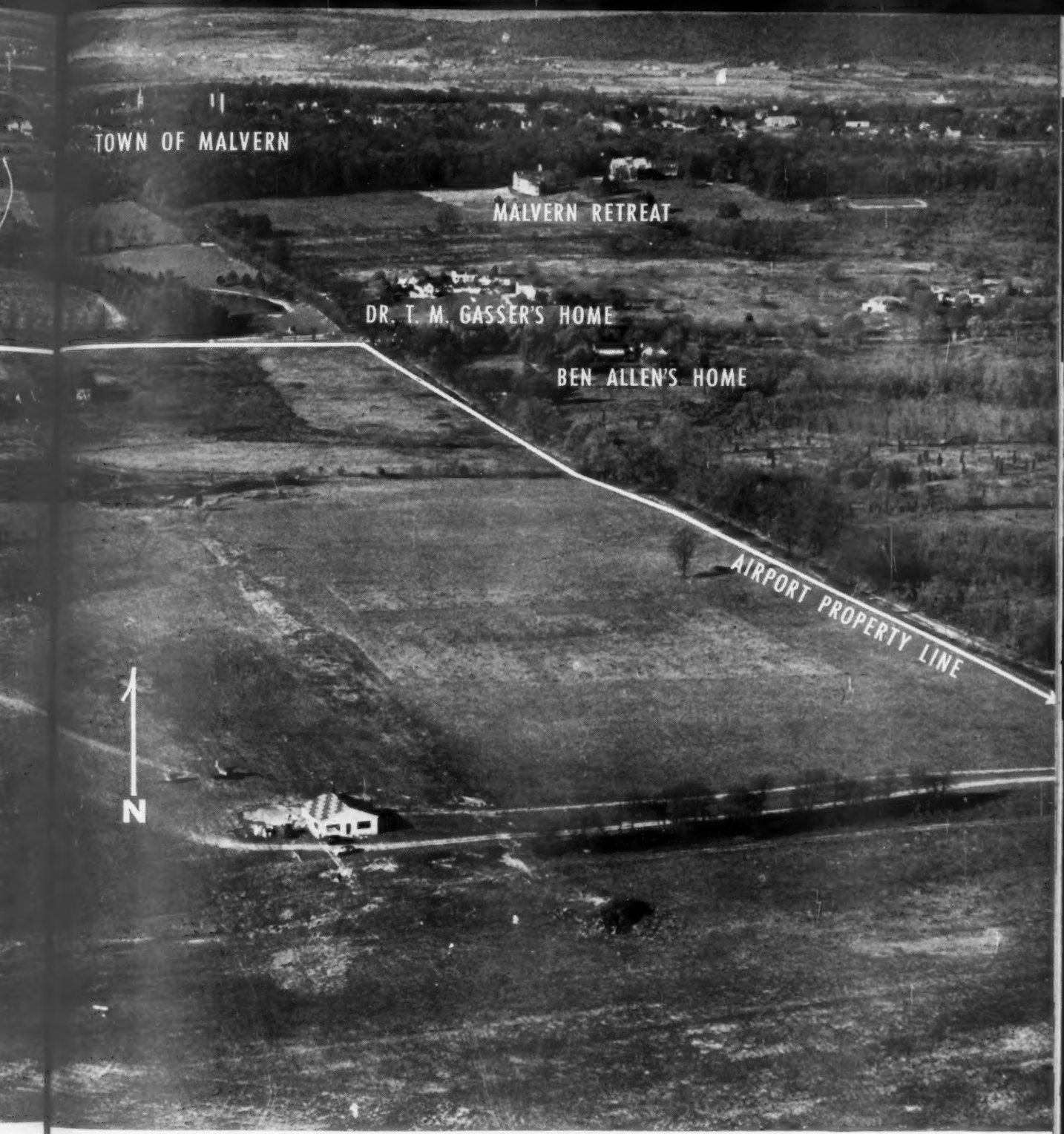
in the vicinity. Scores of queries came in about flying lessons, and newspapers in the vicinity interviewed Krader, who, in a burst of optimism, boosted the values of the field to the community and predicted that it would have 50 planes when it got going—maybe 100. Francis D. Crew, with a home next door to the field, came over to ask questions and express interest in learning to fly and owning his own plane. Everything looked fine.

And then came trouble. Property owners near the field, including the aviation-friendly Mr. Crew, brought suit in the Chester County Court of Common Pleas charging that the airport, when it began operating, would be a public nuisance and should therefore be abolished. Krader and Mumma had to drop everything and prepare a defense.

Even then, things didn't look too bad. Aviation leaders rallied round. The Civil Aeronautics Administration furnished a sound expert. The Aircraft Owners and Pilots Association and the Aircraft Industries Association both offered full co-operation. Civic groups in Paoli endorsed the field and young Fulton and his veterans drew up a petition signed by 1,500 persons saying that it would be "a benefit to the community" and a proving ground for aviation-minded veterans interested in earning a living by flying. The case was going to be troublesome, but anyone who knew anything about aviation—and their names were legion—would support the necessity for the field.

But such, as it turned out, was not to be true. Among the first witnesses brought to the stand to oppose Malvern was an ex-colonel of the Air Forces. George E. DeCoursey was his name, and he lived half-a-mile from Malvern. He had been flying since 1925, and during World War II served overseas with the Eighth Air Force, flying in *Liberators* and *Flying Fortresses*.

The colonel's pet peeve was Mr. Krader's airplane which he objected to because it was not beautiful and made "considerable" noise. It was especially noisy on take-off and "distinctly marred the enjoyment" of the colonel's property, even frightening his chickens. Other



horrors could be expected. "If planes are being warmed up," declared the colonel ominously, "dust might be blown two or three hundred yards." The colonel became so emphatic, indeed, that he described a truck "taking off to the west" as being less noisy than the airplane. The testimony did not reveal whether the truck had wings.

Other neighbors found the field and its planes equally objectionable. Mrs. Walter G. Allen, whose home was also about a half mile away, said that she practically had to scream at guests when a plane flew overhead—and her kennel of kerry blue terriers were frightened by the noise. Thoroughbred mares owned by David Dallas Odell became "terribly upset," as did the horses owned by Edward Barry Ryan. Mr. Ryan, like Colonel DeCoursey, introduced aviation terms into his testimony, saying that horses seeing the shadow of a plane on the ground "will be terrified and take off." Jane Gordon Fletcher, half a mile away, added that she didn't know how it would be possible to live in her house if the field began operations.

Mr. Crew, the next-door neigh- (*Continued on page* 99)

Flying Club

Smith College flyers follow good flying club practices. They keep careful appointment books, request flying time one week in advance. Students who break appointments are fined. Similar discipline is urged for all clubs, but often neglected by non-college units.

Line safety is stressed by Smith girls. Wheels of Taylorcraft are chocked during warm-up. Girls pulling the chocks stand well back of the propeller arc. Precautions like these should be a matter of routine for any flying co-op.

Why do flying clubs have trouble? An insurance company's engineers found the answer and suggested a cure.

b Commandments . . .

By GLORIA W. HEATH

Engineering Department, Aero Insurance Underwriters

AT MOST U. S. airports where lightplane traffic is high, a substantial amount of the activity comes from a flying club operation. How good is it? Check its records at the insurance company's office. As many times as not you will find it unfavorable.

Why? Insurance companies are asked this question repeatedly. Our engineering department has been concerned with this problem and, after studying the accident reports and case histories of a great many flying clubs, has come to some definite conclusions on prerequisites for safe operation. Here's our diagnosis and prescription for a cure.

The outstanding need of any flying club is competent leadership.

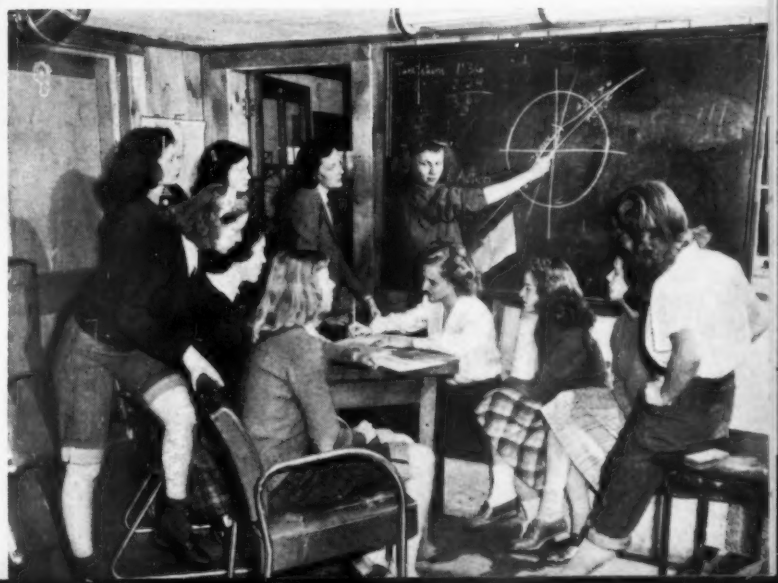
Successful clubs have learned that selection of the manager is even more important than selection of the airplanes. That manager must have the confidence and approval of every member, must supervise the instruction of non-pilot members, be able to give check rides and see that airplanes and engines are properly maintained.

The manager is the final judge of weather and the dispenser of technical advice. Assisted by the safety board the manager should have the responsibility of impressing upon members the need for conservative flying and strict adherence to regulations.

The manager should also be a well-trained pilot with at least 500 hours, hold a commercial license and be experienced with lightplanes. If the manager doubles as instructor, he should have at least 12 graduated pilots to his credit before attempting to teach the club.

Many clubs have found it advisable to have the manager an older pilot—one who has the free time to spend long hours about the airport. If the local airport operator or one of his instructors takes over the manager's job, so much the better.

As for the members, they have (*Continued on page 72*)



Ground school makes better pilots. Here Smith girls discuss a wind drift problem.

AIRLINES vs. P

Airlines get 'the breaks' at municipal airports, charge private pilots who want a showdown on domestic air policy.

By EDWARD DOHERTY

AS personal flying becomes an even greater part of the U. S. aviation picture, the cleavage between the airlines and private flyer grows. Yet nowhere, either in Government or in private aviation, is a concerted effort being made to prepare for or ease the hard feelings, mistrust and actual operating problems which are arising between those who fly for business and those who fly for fun.

Today there are about 76,000 privately-owned airplanes —an all-time high. The scheduled airlines operate less than 1,000 transports. Estimating the future, the CAA says there will be 400,000 personal planes plying the airways by 1956 while the airlines are unlikely to exceed 5,000, a most optimistic figure. And this traffic problem, given as the primary reason for "segregation" of private and commercial flying at some airports, is small now compared with the possibilities of the next few years.

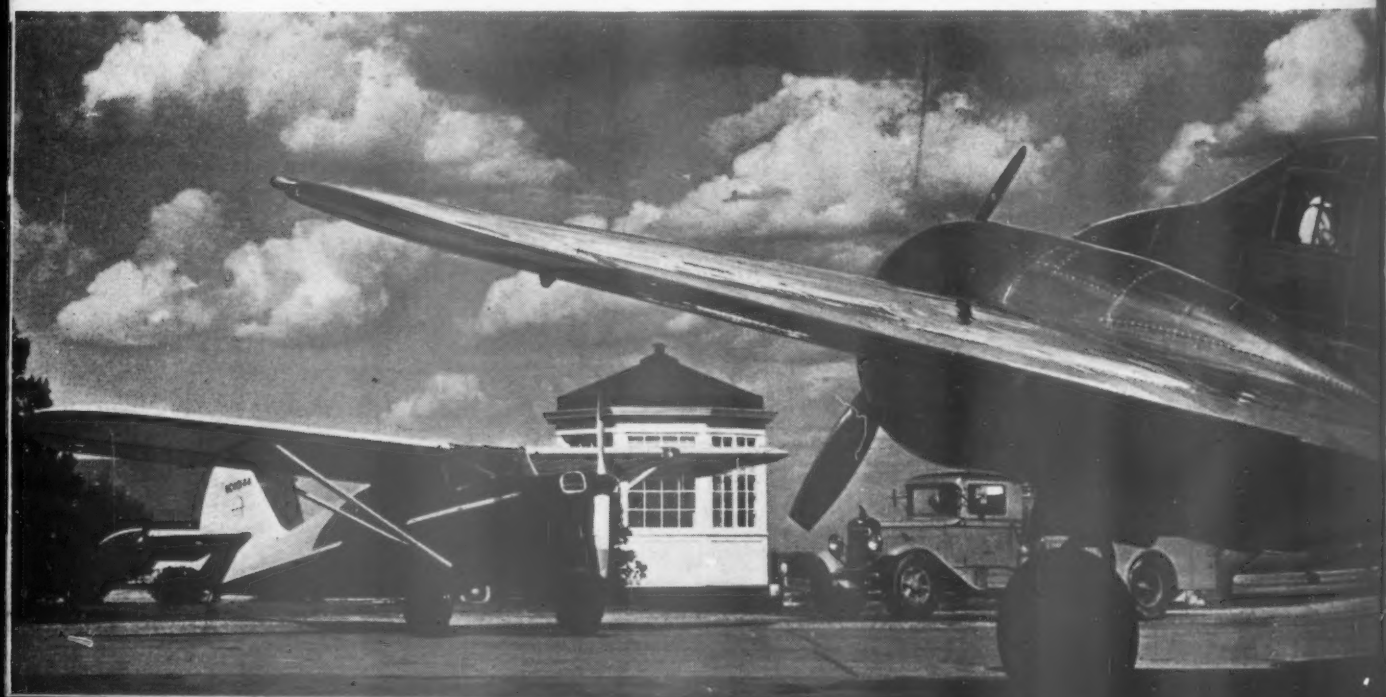
The greatest point of contention between the airlines and private flyers is the segregation of the two on large municipal airports, where airlines are given preference. While no airport has yet barred personal planes outright, that end is accomplished by requiring radio installations or by charging for landings, tie-down privileges, for the use of lighting facilities or for parking. One airport owner in California even tried to charge for the use of airspace over the field, but was thoroughly rebuffed.

The Aircraft Owners and Pilots Association acts in behalf of personal pilots and only recently was instrumental in dissuading the cities of Philadelphia and Buffalo from instituting a schedule of landing fees for non-airline planes.

J. B. Hartranft, Jr., AOPA general manager says: "Our organization is categorically opposed to landing fees. We have no objection to the segregation of airline and private planes, provided the municipality builds landing fields for the exclusive use of non-scheduled pilots which are equally as accessible as the airports set aside for airline use."

According to Hartranft, the basic question is one of Government policy. Should airports built with public funds be reserved for the use of commercial interests? A recent Attorney General's ruling says such airports may

Roosevelt Field, N. Y., was a lightplane haven until some airlines moved in. Now owner of Stinson 150 (below, left) must pay landing fees which many interpret as an attempt to force the private pilot out and clear field for company-operated planes.



PRIVATE FLYING

Hoosier-Parks Airport lan. . 365 transient planes in one day. Only a light-gun was used, indicating careful traffic control offsets dangers of congestion.

not be restricted for the use of a monopoly, but the term "monopoly" was not defined.

There is not yet an industry-wide policy among the airlines that discriminates against personal aviation. On the contrary, most airline executives are acutely aware of the value to them of private flying enthusiasts, who become airline passengers almost automatically whenever they must travel long distances. Some airlines even attempt to aid private pilots, notably TWA, which issues "courtesy cards" to AOPA members and others.

Holders of such cards have often been given maintenance help by TWA employees, have obtained hangar facilities in emergencies for nominal fees, have been allowed to purchase fuel from company supplies, and have generally been aided whenever possible by TWA men. Some other airlines lend a helping hand to the lightplane pilots when doing so will not interfere with the business of maintaining their transport flight schedules.

The airline bias against personal pilots comes largely from individual pilots, dispatchers and others who see only danger in mixing the slower-flying planes in the same traffic areas with high-speed transports.

One airline pilot-executive believes a very real danger would exist at LaGuardia Field, Washington National Airport and other heavy traffic centers if the volume of lightplanes using those fields should increase. "Nothing but trouble comes from mixing *Cubs,* (*Continued on page* 70)

Constant worrier frets every moment her "little boy" is in his horrible plane.

The Pilot's Missus

By RUTH DOWNIE

CARTOONS BY DICK SHAW

Shed a tear for the airport widow whose husband was bitten by the aviation bug.

THERE are grass widows, *Black Widows,* The Merry Widow, the widow next door—and now the airport widow.

This aviation variety may be classified as to three general types: the stay-at-home, the airport sitter, and the passive or protesting passenger. Unfortunately the two latter types predominate.

All three types come in many shapes and sizes, some good, some terr.fic and some . . . Stir them up at a bargain counter and you couldn't tell one type from the other. But when you mix in a bit of aviation . . .

The stay-at-home girls are just indifferent. They flatly are "not interested" or "can't be bothered" with aviation. They are too busy with housework, bridge, gossip or kids to give serious thought to hubby's flying or to "those awful people he runs around with at the airport."

The second group is more to be pitied than cussed. Its classic representative is the little wife who rides out to the airport with hubby and remains sitting in the car while he dashes off to his beloved airplanes. She might get out and stroll around, she points out, if there were any chairs or benches where she could resume her sitting —or "if the few available weren't already occupied by slouching males." So she watches the planes with casual interest—until a prop blast dusts her. Usually it's not a lovable wife that greets hubby when he finally returns to earth.

Another member of this same group is the sitter-worrier who chews nails or "oh's" and "ah's" every time a plane drops a wing in the landing pattern. This sweet lass is petrified with fear every moment her darling husband is in the air. About the only hope in handling this type is to convert them into stay-at-homes—that way they are out of people's hair.

Then there is the third type. They are the wives that coaxed, cajoled or possibly (*Continued on page* 68)

TOLERANT-GOOD-SPORT TYPE

CAN'T-LEAVE-THE-KIDS TYPE

DECORATIVE-BLASE TYPE

FAITHFUL-SUFFERING TYPE

LUXURY-LINER TYPE

Clean lines have much to do with the Bonanza's performance. Its "butterfly" tail will be on all new Beech types.

Instrument panel has flight instruments in front of pilot, radio at his left. Inset shows vernier throttle and metal strip of switches.

THE *Bonanza*

FEW private aircraft have ever received so much advance word-of-mouth build-up as the *Bonanza*. But neither had this airplane been able to escape the usual "anti" rumors—all of them, as usual, a lot of bunk.

Until a few people were able to fly the first experimental *Bonanzas*, it was common gossip in aviation circles that this airplane was a phony, that it was the result of a lot of paper calculations that weren't worth the slide rule they were computed on. That attitude could have been defended on the grounds that some so-called aircraft manufacturers in the past ballyhooed new designs they cooked up, only to fizzle miserably when it came time to deliver what they promised.

The *Bonanza* is no pipe dream. Those figures that Beech put out—and guaranteed within three per cent—are all true. But it was natural to wonder at first if there wasn't a catch in them somewhere, even though I've flown several *Bonanzas* and know now from my own experience that the airplane is everything it's said to be.

At this writing I have logged something over six hours in *Bonanzas*. I have flown them into and out of airports with paved runways, as well as small cow-pasture fields. I have flown them cross-country, in extremely turbulent air, and have even made a number of night take-offs and landings.

Shortly after the *Bonanza* received its Type Certificate (on November 13) I flew to Wichita to get some time in the production airplanes. I had flown an experimental *Bonanza* several months ago and had been amazed. But a few changes had been made in the certificated model so I went back (*Continued on page* 88)

Baggage up to 100 pounds is carried in 14-cu. ft. compartment behind cabin.

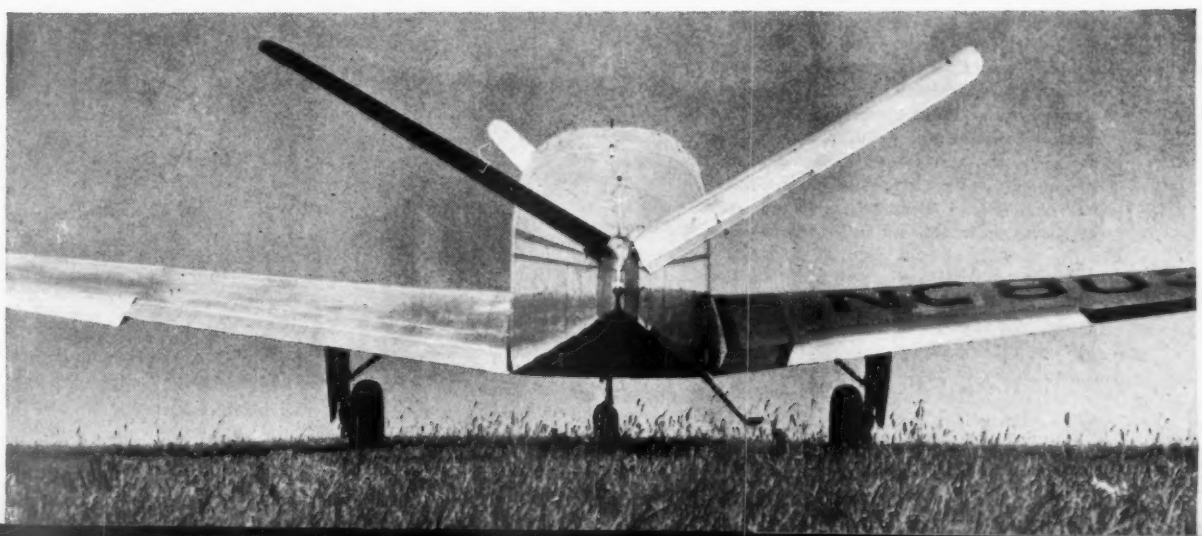
Nose wheel has novel scraper in rear to prevent mud being thrown into prop.

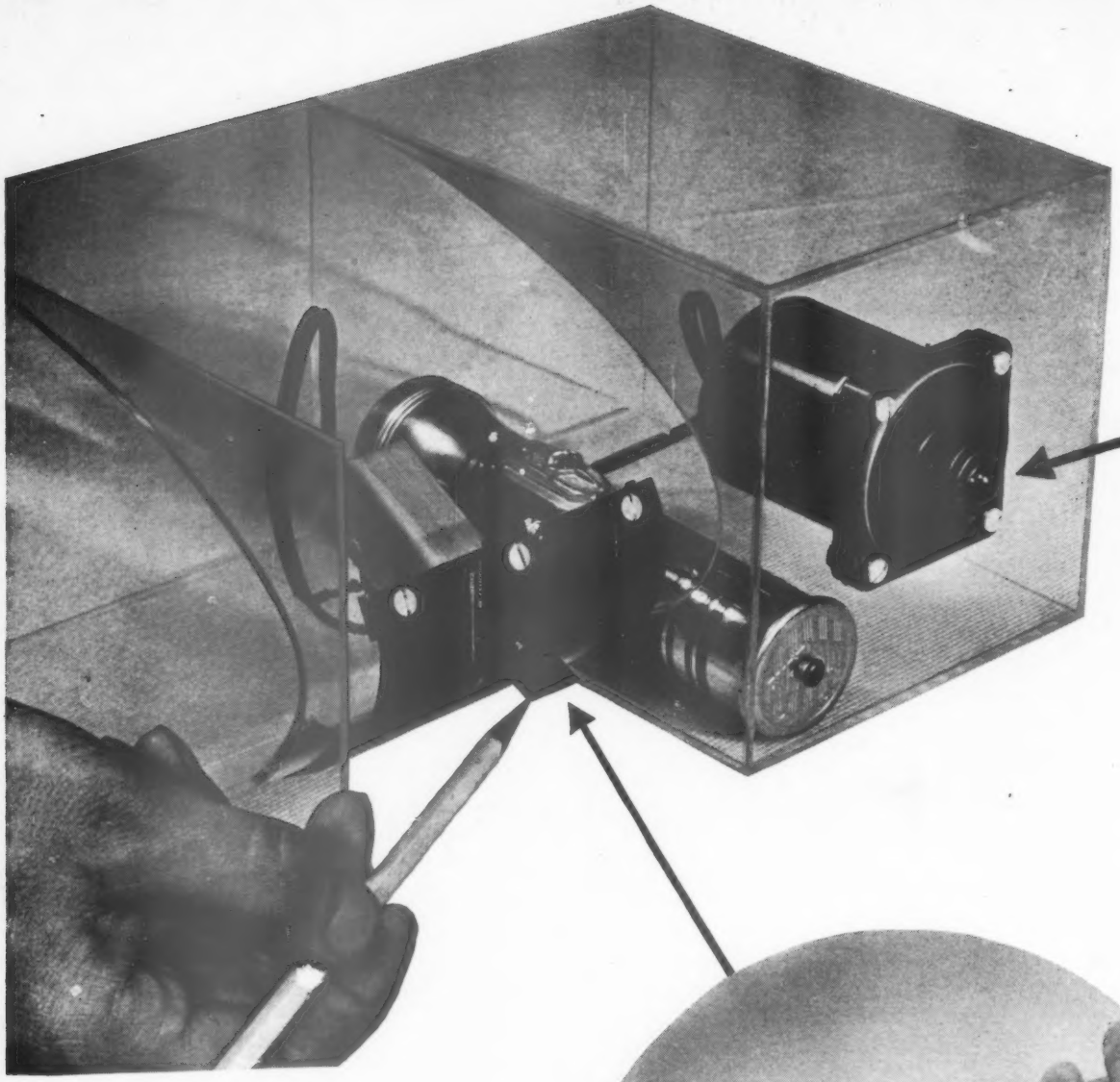
FLYING's CHECK PILOT

EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Only aircraft holding a CAA Approved Type Certificate are flown. The author is not a professional test pilot. He evaluates each aircraft through the eyes of an average private pilot who flies an airplane either for business or sport.

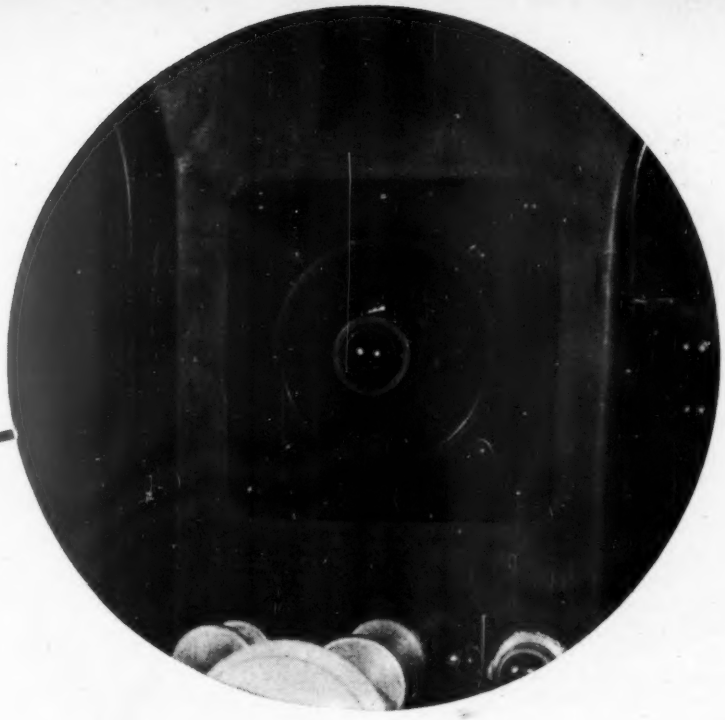
Novel tail and ailerons are shown set for normal turn to the right. Slight up-elevator also would be used. Veteran pilots flying Bonanza are unable to feel any difference in characteristics because of unusual tail. Radio loop is in fuselage tip.





WING PLACEMENT

Cutaway diagram above shows relationship of stall indicator's essential parts. Pencil is pointing to tiny vane which can be installed in leading edge of any wing (like that at right). When a stall is approaching, airflow across the vane flicks it up, thus closing an electrical circuit which operates the warning signals. The mounting is flush with the wing and requires a hole only 1x1½ inches in the leading edge. The wiring circuit can operate from the plane's electrical system or can be hooked up to ordinary flashlight batteries.



COCKPIT PLACEMENT

The warning indicator placed in cockpit is only the size of an ordinary oil-temperature gauge. Its light is adjustable for day (bright) or night (pin-point) and the horn warning is heard above any engine noise. Pilots ordinarily will test the indicator by a routine flip of the finger against the vane before they climb into the plane. On take-off indicator operates at stalling speeds just before flying speed is reached and again on landing. The indicator cannot be shut off.

Beating the Stall

New fool-proof warning indicator toots a horn and flashes a light when a stall approaches.

By JOHN H. LANCASTER

New York Editor of FLYING

THE accidental stall has been licked—not by restricting the controls or carving slots in the wings—but by putting a little gadget costing between $15 and $25 on the leading edge of the wing and connecting it with the instrument panel. No matter how the plane is flying or in what position, this instrument will make the pilot aware of an approaching stall by a honking horn or a blinking light. Result, insurance rates go down and 125 lives a year are saved.

Already several hundred of these devices have been custom-built and soon the production line will be turning them out rapidly, according to Dr. Leonard M. Greene, aeronautical engineer for Grumman Aircraft Engineering Corp. Dr. Greene has been working on this indicator for six years and received CAA approval on it in 1944. The war has delayed production until now.

Dr. Greene's device weighs 14 ounces and consists of a postage-stamp-size vane, which can be fitted on leading edge of either wing and a horn-light warning unit located anywhere on the flight panel.

The vane is made of aluminum. It protrudes from the leading edge, pointing fore and down in an overhung, lip-like arrangement, which prevents water or foreign objects from entering the crevice around the vane. The installation, which can be done while the aircraft is being manufactured or upon existing aircraft, is exceedingly simple. It can be accomplished by cutting a hole, 1x1½ inches, in the leading edge of the wing. Two nut retainer strips are inserted through this hole and fastened by a screw in the center of each strip. A plate covers the hole so that the entire mounting is flush with the wing.

Equally simple is the electrical wiring circuit, which can be operated either from the aircraft's battery system or on ordinary dry cells. It is connected through the wing to the horn-light warning unit on the instrument panel.

The vane operates by moving up and down over a ⅛-inch path, causing the relay inside the wing unit to click on and off. When down, the circuit is open, which corresponds to normal flight conditions. When the angle of attack of the wing is close to that which causes a stall, the air flow across the vane is such that it flicks up the vane. This closes the circuit and operates the horn-light warning unit.

The margin at which the stall warning indicator operates is determined by the location of the vane on the wing. The desirable margin has been determined for various types of lightplanes and larger aircraft and templates have been designed to insure proper location (*Continued on page* 76)

Aviation's Super-Service Stations

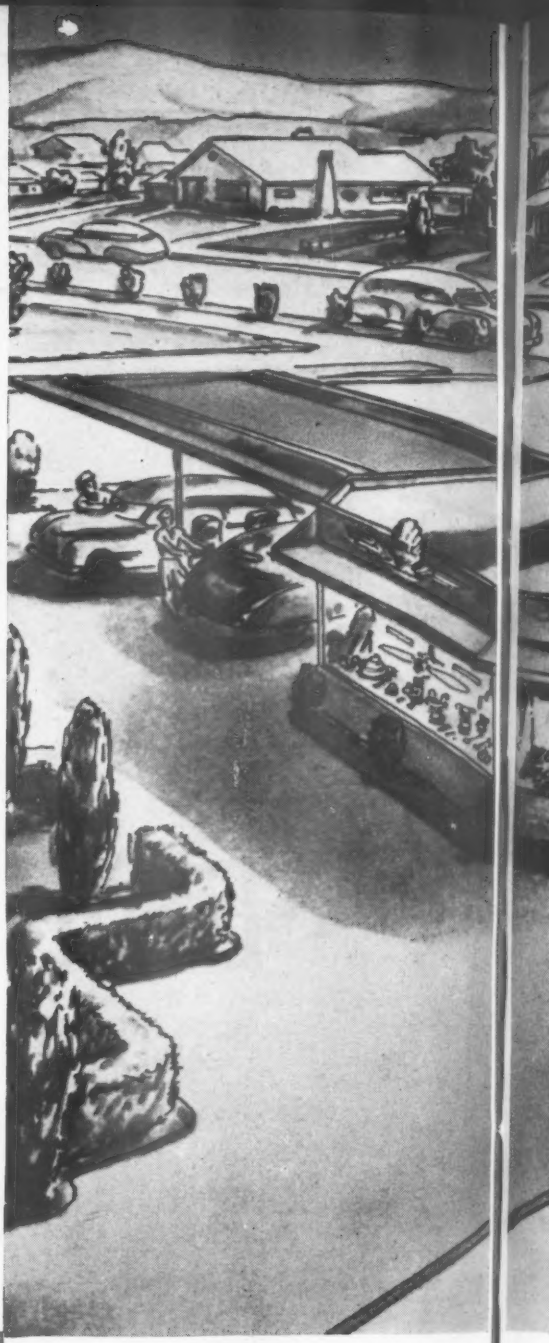
By J. MONTGOMERY FARRAR

MAJOR oil companies are throwing their combined weight into a co-operative drive to clean up our airports. Officials of these companies frankly admit that philanthropy is not the impelling motive. Their drive aims simply at more business —big business at that. They figure that if the CAA prediction of 400,000 prsonal plane owners by 1955 comes true there will be $133,000,000 worth of aviation gasoline sold each year. To meet this market, each company visualizes a nation-wide string of airport sales-stations that will be models of efficiency and cleanliness. Each company will improve distribution of its products, and each will give its dealers training in the use of better business methods.

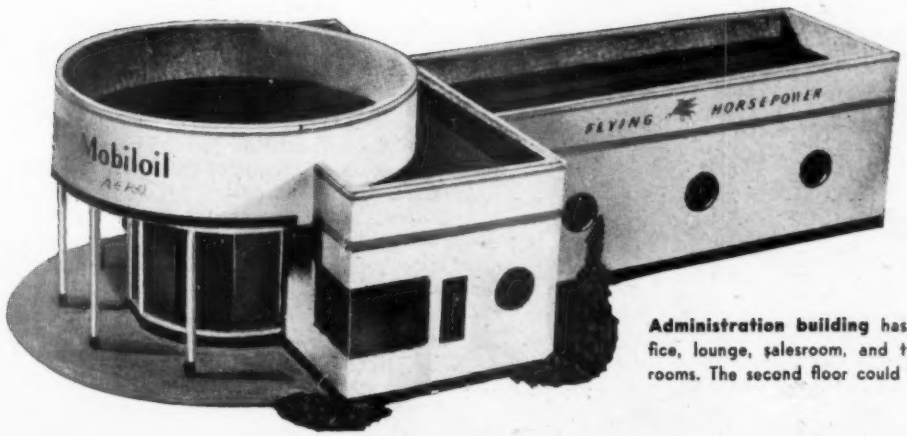
Such planning means increasingly better airport service. But the long-range aviation programs of these companies will go much farther. Such programs will extend the bounds of aviation business just as highway promotion during the 20's and 30's produced a boom in the automotive industry. In short, long-range aviation policies of the oil interests aim at intelligent airport promotion.

Leaders in this broadened air activity are Gulf, Shell, Socony-Vacuum, and their competitors, Standard Oil Companies of New Jersey, California and Ohio. Becoming active are Cities Service, Humble, Phillips Petroleum, Pure Oil, and Sinclair. Amoco and Sun may come in later.

Most of the companies already are pushing this two-fold aviation program—(1) improvement of service through their dealers and (2) promotion of flying in general and development

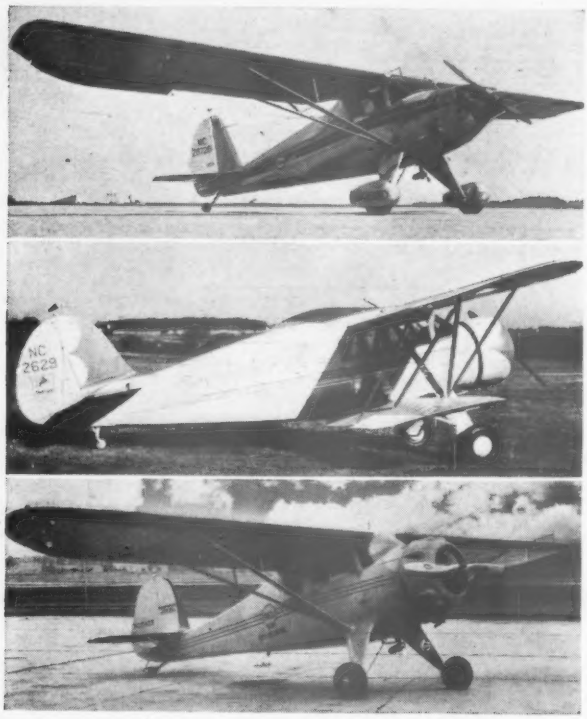


Service stations of the future (above) would cater to both automobile and airplane owners. Building houses shops for minor repairs, greasing and oil changing departments. Trailer (left) comprises a first step toward more complete plane servicing. It carries gas, oil and generator to help plane's batteries during starting. Gas hose is on full-swiveling boom, cannot drag over Waco's fabric.



Administration building has four-car garage, office, lounge, salesroom, and two dressing and rest rooms. The second floor could have a control tower.

OIL COMPANIES USE AIRCRAFT



Company planes fly to almost every airport in the U. S. on business. From its pilots the petroleum industry learns first hand what improvements are needed. Luscombe (top) is used by Esso aviation products salesmen. Waco (center) is a Socony-Vacuum personnel transport. Monocoupe (bottom) patrols the pipe lines used by Shell Oil to carry the crude oil to its refineries.

Jimmy Doolittle, Shell Oil vice president, accepts delivery of converted North American Mitchell from Albert I. Lodwick.

of airports in particular. At present the work moves slowly mainly because highly-trained personnel is required.

Warren L. Baker, manager of Socony-Vacuum's aviation department, says "our pilot-salesmen are actually engineers with a thorough knowledge of aviation."

Similar qualifications are required by Esso Marketers, the Standard Oil Company of New Jersey. Salesmen of proven ability were selected and Esso paid for their training as pilots. All of them had been with the company 10 years or more and their ages ranged from 30 to 52. Training emphasis is placed on business and technical conditioning. Prize competitions were promotional devices.

What the famous flyers did with stunts and speed to arouse general interest in aviation paid off well enough in days gone by. But what the pilot-engineer-salesmen are doing now will pay much larger dividends. Their work is not as spectacular, but it is far more helpful to dealers, operators and local airport committees.

Oil company airplanes are used for field liaison work and executive travel. The Texas Company, for example, maintains a fleet of 16 airplanes. Cities Service operates eight, Shell has six planes in domestic use, Socony-Vacuum has 14, and Standard Oil of New Jersey maintains 13.

How does all of this add up in one day's activity? Let us assume that an up-state New York city has become airport conscious. A number of its business men are interested in building an airport but they need a helping hand. However, they feel that they are not well enough organized to call in the CAA. With business-wise surveys already in hand, Socony-Vacuum's representative at Albany, G. R. McRobbie, gets on the job. He arranges a meeting of some 50 citizens and asks H. M. Long, manager of the Socony airport division, to fly up from New York city. We go along to watch the oil men in action.

After introductions and preliminaries, there is a showing of the company's sound film, "Ceiling Unlimited"—a brief, absorbing history of aviation's growing importance in the U. S. transportation scheme. It emphasizes that every progressive community should have an airport.

After the showing, Long directs a discussion on airport planning and economics. His outline is based on fact and he illustrates his points with six pictorial charts entitled "Analysis of Community." Here's what the charts do:

1. Analysis of Airport Area. A large-scale map shows a town of similar size and with comparable problems and the area within 50 miles of it. Community statistics have been compiled, showing the population, major and minor industries, educational institutions, transportation facilities, automobile agencies, and country clubs. Retail sales per person per year are tabulated; and a thumbnail description of the business and residential districts is given. The "support area," within 50 miles, is also analyzed, to show the neighboring towns and villages, the type of development, the industries, and the total area population.

2. Selection and Analysis of Site. A larger scale map is shown, with several possible airport sites indicated. Consideration is given to each with respect to the following factors: accessibility by bus or street car lines; size and shape; weather conditions; availability of utilities such as water, light and sewers; topography; type of soil; adjacent obstructions; and cost of property. The economic characteristics are studied, and it is seen that one particular site meets all requirements best, and can be expanded to a Class II airport.

3. Initial Stage of Airport Development. Using the site selected, the initial development is shown on a large-scale drawing. The administration building is designed for merchandizing aviation services, and for planned, orderly expansion. Also shown are hangar, shop and dope rooms, multiple unit hangars, and fuel facilities (single-unit dispensing facility at this stage, but designed to serve as an integral part of (*Continued on page* 96)

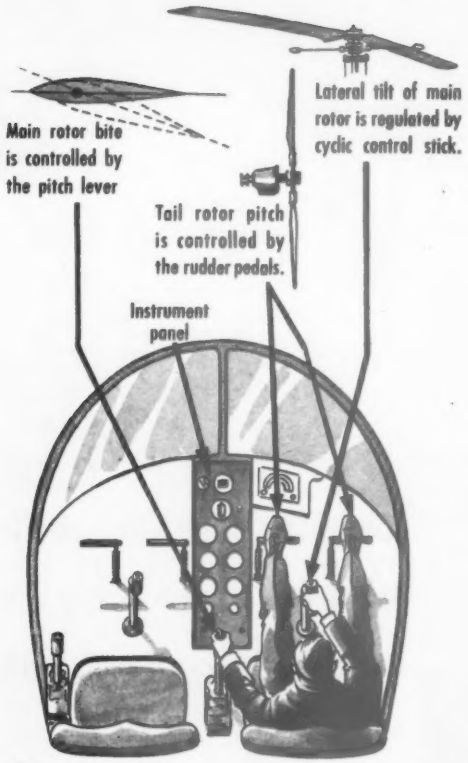
HOW TO FLY A *Helicopter...*

The Bell Model 47B whose prototype won the world's first commercial license.

Feet on rudders? Hands on pitch stick and cyclic control? You're ready for your first 'copter flight.

START Press starter button, let engine turn over few times, then thumb-flip magneto switch to "both."

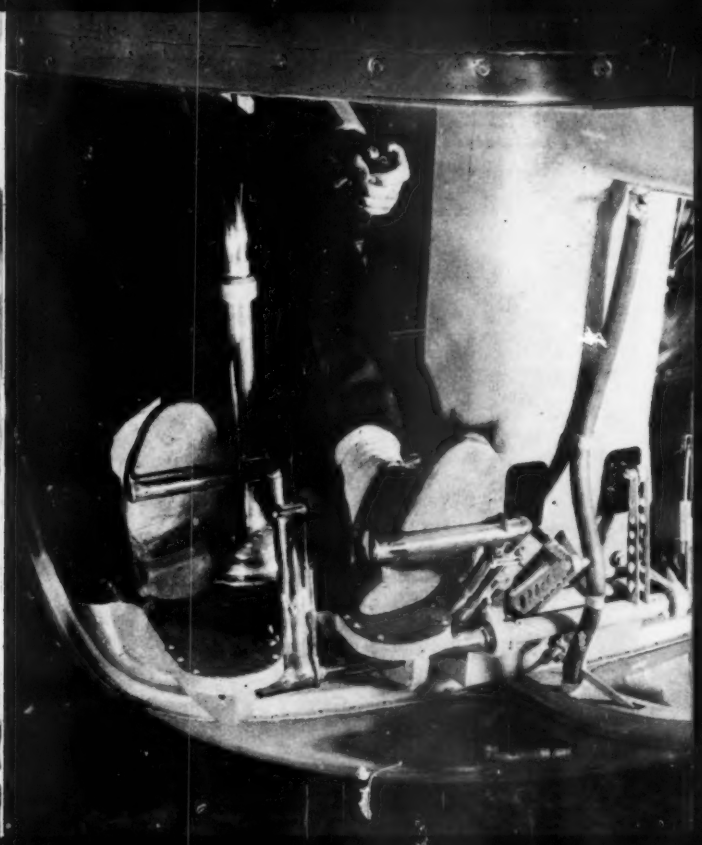
WARM-UP Hold pitch lever down to eliminate lift. Twist grip to advance throttle.


Main rotor bite is controlled by the pitch lever
Lateral tilt of main rotor is regulated by cyclic control stick.
Tail rotor pitch is controlled by the rudder pedals.
Instrument panel

SO YOU want to fly a helicopter? Frankly, there are plenty of flyers with hundreds of hours of fixed-wing experience waiting in line for all the training the Army, Coast Guard and manufacturers of helicopters can provide. But there's no reason why you can't pick up the rudiments of 'copter flying right now. Just step over to this Bell Model 47B—it's the latest version of the 'copter that got the world's first commercial license.

As you step into this coupe-type helicopter note that it's a lot like getting into an automobile. Inside are comfortable side-by-side seats with plenty of leg and head room. These instruments and the dual controls are so placed that either occupant can act as pilot. Check that instrument panel—there is the air-speed indicator, altimeter, compass. Down here is a fuel gauge and gauges showing oil, fuel and manifold pressure and there are the indicators for oil and cylinder-head temperature. The two-way radio to the right of the instrument panel is standard equipment. That's about all—just what you would expect to find in a deluxe model lightplane. Only the tachometer is different: it gives both rotor and engine r.p.m.

You have already noticed stick and rudder pedals located just as on a conventional aircraft. Those rudder pedals control the pitch of the anti-torque rotor—the small rotor back on the tail boom of the 'copter—they give you directional control. The stick (called the cyclic pitch control) determines the tilt of the main rotor, giving you sidewise or lateral control. Slanted forward just to your left is a control device with which you probably are unfamiliar. It is called the collective pitch control. Raise it and you increase the pitch of that main (*Continued on page 48*)

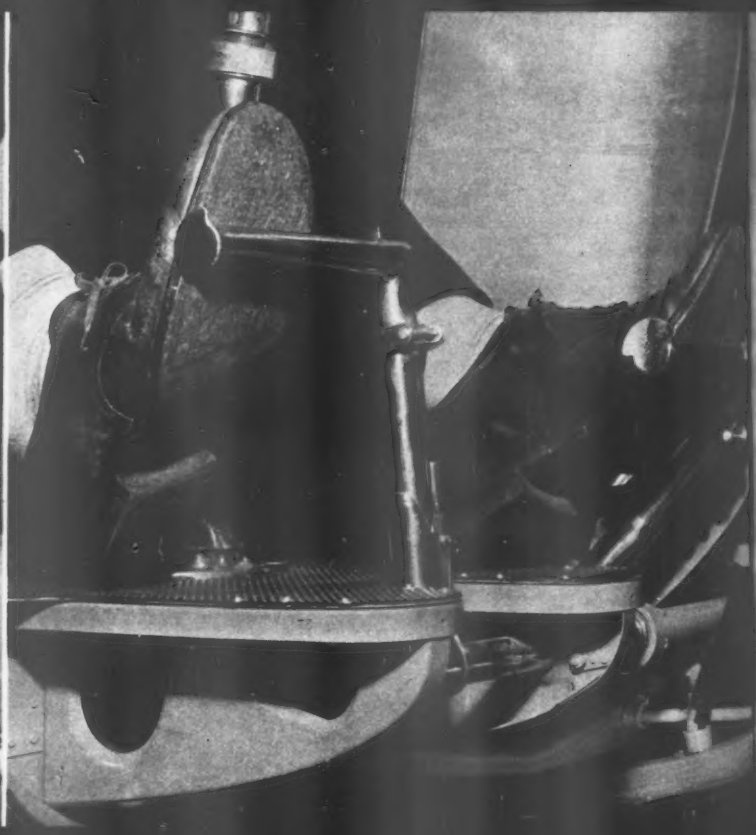


TAKE-OFF Engage automatic throttle with button on end of pitch lever. Neutralize cyclic control stick. Raise pitch stick to give rotor blades required bite; (right) use left rudder to counteract torque.

CLIMBING By slowly increasing pitch of the main rotor plus precise co-ordination of lateral and directional controls as shown in pictures and diagram, the 'copter can be flown straight up.

Helicopter
(Continued)

HOVER Groundling view of suspended flight indicates reason for enthusiasm over potential uses of the helicopter. With balanced controls, pilot can hover over points where inspection, photographic, rescue work is required.



FLIGHT RIGHT To move directly to the right without change of heading, move stick to right and raise pitch lever to compensate for loss of lift. Hold left rudder (as shown at right) or you'll ➧

FORWARD Move the cyclic control stick forward and the main rotor tilts in that direction, pulling the suspended fuselage along in normal nose-down attitude of forward flight (right). The 47B will do up to 100 m.p.h.

do a banked turn to the right. Photo above shows how fuselage of the 'copter tilts in the direction of the main rotor pull. Altitude is maintained by balancing pitch and cyclic controls as shown in the diagram.

Helicopter

(Continued)

Farmyard is adequate port for the 47B. Its stabilizer bar (at right angle to main rotor) is an exclusive Bell feature.

rotor overhead. The extra bite of its blades gives you lift. The buttons on the end of this pitch lever control the automatic throttle. Push the button on the right and your throttle is automatically governed. Push the one on the left and you can control the throttle manually by twisting the pitch-lever handle, just as you do on a motorcycle. You will need this manual control right now during warmup, so let's push that left button down.

To the upper left of the instrument panel is the starter button, to its right is the magneto switch. With your pitch control lever all the way down and the cyclic control stick neutralized, reach over and press the starter button with your forefinger. Let the engine turn over a few times with the switch pointer at the "off" position; now thumb-flip your switch to "both" magnetos. Drop your left hand to the pitch lever and use manual throttle control to run up the engine and to check the magnetos. Now check the response of the main rotor to the cyclic control stick; its tilt should correspond to the movement of the stick. With engine adequately warmed and controls checked we now are ready to see what they do.

During warmup we have been balancing the torque of the main rotor with the rudder pedals. Now press down on the right rudder and our 'copter begins to swivel about to the right. The swiveled wheels in front will permit us to swing completely about in this manner and in either direction. You stop the turn by again balancing controls.

With rotor synchronized to, say, 1,800 engine r.p.m., flip the switch on the end of the pitch lever for automatic throttle control and we'll use a rheostat control to gauge its automatic performance to 3,000 r.p.m. Now be ready to apply more pressure with that left rudder as you lift slowly on the pitch lever. Note that engine power increases automatically. The additional bite you have given the main rotor blade has lifted us clear of the ground and we are going straight up "just like an elevator." To halt our (*Continued on page* 80)

BACKWARD Ease cyclic control back, pitch-control up and the 'copter flies

GLIDE Lowered pitch stick cuts auto-throttle. The change in r.p.m. ratio releases automatic

backward, nose-high. Its rate of speed will be determined by pitch and tilt of main rotor. Rudder control is a bit more difficult to balance in such flight. Position of hand controls and resultant flight attitude is shown in insert.

rotor clutch for auto-rotation glide. Air velocity causes "free-wheeling" rotors to turn at rate at which gliding control is maintained. Maneuver is made on normal landing approaches or in the event of engine failure.

Helicopter

(Continued)

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FLARE-OFF To check speed of the glide—or to effect a quick stop with power on—ease pitch stick up, cyclic control back. Resultant flare-off (right) leaves 'copter ready for hovering or power-off landing.

SETTLING With power on and controls carefully balanced, pitch of main rotor can be reduced so gradually that the 'copter settles to the ground "light as a feather." It can be "held off" at altitudes measured in inches.

REPORT FROM WASHINGTON

By FRED HAMLIN

THE Cleveland National Aircraft Show is now a dim memory, and there are those who—perhaps not without reason—take an even dimmer view of it. But we will continue to think that, for all its faults and despite all the miles we walked covering it, the show did what it set out to do—pioneered the way toward making the airplane an important part of the post-war world. Pioneering is never 100 per cent successful. But it takes courage, and the industry is to be congratulated on the courage it displayed in putting on the Cleveland show. . . . To look at it another way, the show made history, and we're proud that we contributed a little to that history in publishing the FLYING DAILY during each day of the exhibition. That in itself was not history-making, but the way the paper was put out marked a new first in aerial journalism. All copy written ring-side at the Bomber Plant, scene of the show at Cleveland airport, was flown from there to the city's downtown strip, whence it was rushed to the printer by automobile. All finished papers which were distributed at the Bomber Plant came by air from the strip to the airport. Making this possible were a Stinson *Voyager 150,* an *Ercoupe,* and a *Navion.* To all who participated in the show, our heartiest congratulations.

U-Build-It

You, too, can build an airplane with assurance that it will be certificated by the Civil Aeronautics Administration. Case-in-point is the Dart Aeroplane Company at Tecumseh, Mich., whose owner, Ray Applegate, is producing a *Dart* in kit form. You buy the kit, get it assembled at a certificated CAA repair base, get an official okay on it, and it is forthwith licensed. Reason: Applegate has already built a *Dart* and had it certificated—the kits are simply knock-down replicas of the same airplane. When a certificated replica has been put together and okayed by a certificated A&E mechanic, CAA says it is good for a license. The principle is the same as it is for planes that are shipped in crates and then assembled and licensed. . . . The industry is watching the *Dart* program closely—could be kit planes will become a not-unimportant part of aviation's post-war merchandising plans. Besides the saving in assembly costs, freight costs would be reduced to the consumer's benefit.

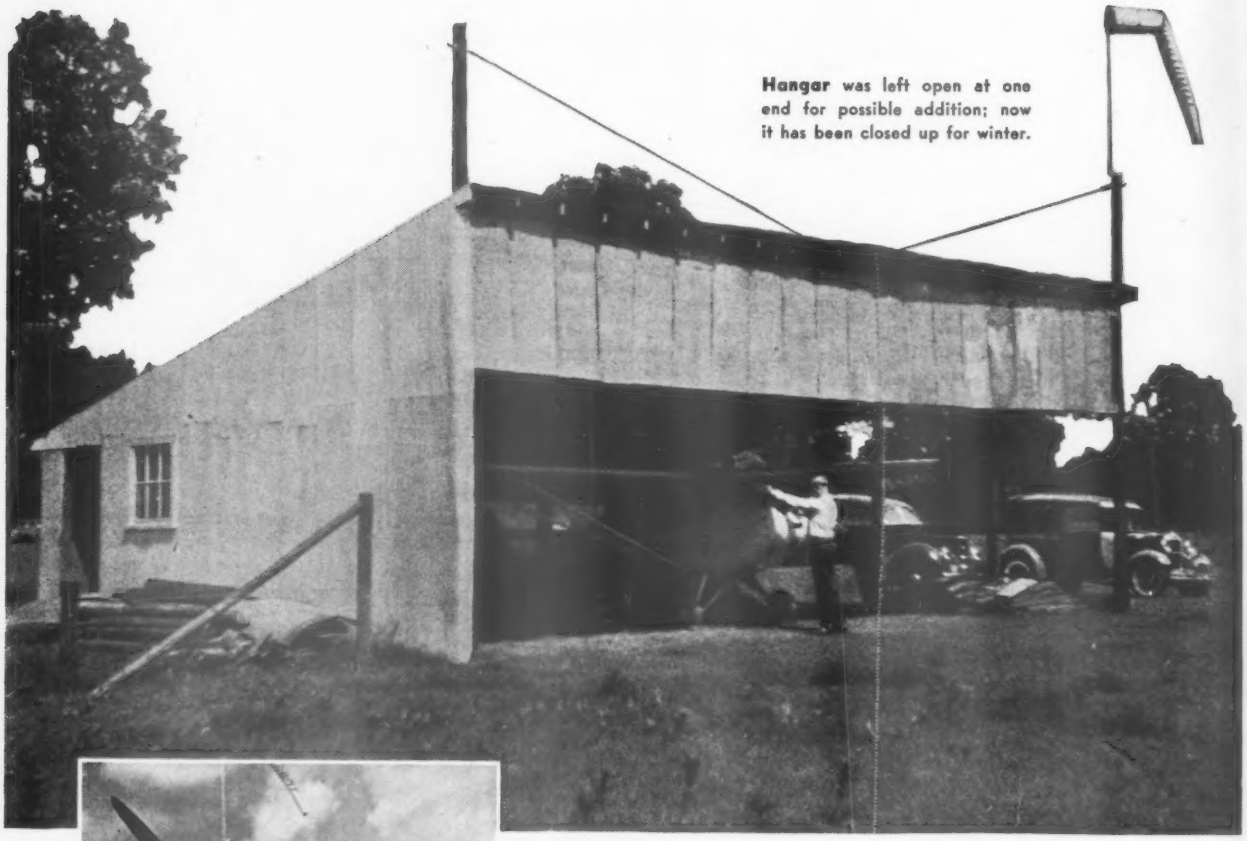
Tiger Cubs

Don't look now, but we have it on excellent authority that Claire Chennault no sooner shucked his AAF uniform than he went back to his pre-war love—China—and began organizing a new version of the Flying Tigers for the Kuomintang government. It's basically the same as the old, too—he's recruiting crack U. S. war aces. Their first duty will be to escort Chinese transports and defend them if necessary. They'll also train native pilots, crews, and maintenance units. Advisory work on Chinese airports will be another aspect of the work. Highly qualified fighter pilots, according to our information, are being offered as much as $1,500 a (*Continued on page* 86)

CLEVELAND AIR SHOW

The First National Aircraft Show at Cleveland was a magnificently staged exposition with a somewhat disappointing attendance. Located in a portion of the huge Fisher bomber plant at Cleveland airport, this view of the show is from the north end of the building, looking south toward the administration headquarters. In foreground are Lockheed and Martin exhibits in the air transportation section.

One-Man Airport



Hangar was left open at one end for possible addition; now it has been closed up for winter.

Author must be his own prop boy on a one-man port. Wheels chocked, he swings it easily.

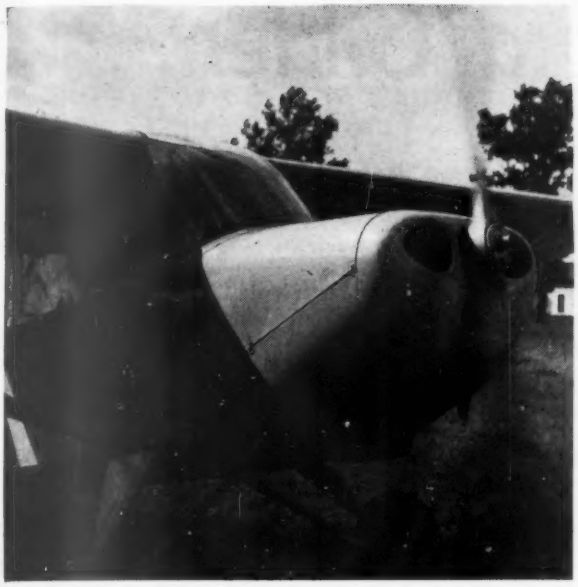
Landing space, a plane and a hangar can make you an operator, if you're a rated instructor and are willing to start small

By
SHIRLEY E. JOHNSTON

WHENEVER I land on one of those fancy airfields with paved runways and big offices and maybe even a restaurant, I can't help getting a sort of wistful feeling, because I know I'm never going to have a nifty setup like that. But when I take off again and fly back to a little airport in central Wisconsin I never fail to forget it. I swing around the pattern without any traffic to bother me, because mine is the only plane there. And as I taxi up to the metal hangar I know there's something extra special about it—it belongs to me.

Not only that, I built it with my own hands, plus some help from friends. Last winter I went out in the woods and cut the logs that I needed. I hauled them to a sawmill and had them sawed into lumber for framework. I wangled some corrugated steel siding and put it up. It isn't the handsomest hangar you ever saw but it's just as strong as if it were gold-plated.

If you landed at my airport in the middle of the day, the only activity you would find would be the wind sock turning into the breeze. There wouldn't be a mechanic there



Aeronca Champion keeps Johnston busy with instruction in afternoons and evenings. He plans to start a charter service.

Paint job on Model A "taxi" is not author's handiwork. He woke one morning to find it had been daubed free of charge.

to greet you nor a line boy to direct you nor anyone to pump your gas. I don't have a telephone and you'd have a heck of a time finding one to call me up. If you are one of those private pilots who is always complaining about the type of service you get at the airport you wouldn't even have any service to complain about.

You see, I'm not set up to serve transients. I run a strictly one-man operation. Maybe it would be more accurate to call it a "half-man" operation since I'm only there late afternoons and some mornings—and of course on weekends. I have only one plane so far—an Aeronca *Champion*—but I intend to add a Piper *Super Cruiser* just as soon as I am able to buy one. Eventually I will probably also have a couple of privately owned planes on my airport but I never really expect to get much bigger than that.

I have located my airport in the country I grew up in. I did so because I like to live here. It isn't the most prosperous farming country in Wisconsin by a long shot. The biggest town I have to draw on has less than 2,000 population. Yet I manage to get along pretty well.

My airport is about five miles north and west of the twin towns of Friendship and Adams on State Route 21 in Adams County. It is about four miles from the settlement of Arkdale, where I have lived since I was eight. There are four or five other towns of about 1,000 population within a 30-mile radius which do not have their own airports, and I get business from them.

I know that such a setup may not sound too inviting to an airport operator accustomed to drawing on big urban areas. And the natural attitude of many operators is to imply that a one-man airport can't pay off. I assure them and you that it isn't so and that students learning to fly from me get as good instruction as they do on the big city airports.

I've done plenty of flying in the past nine years. I'm one of those pilots who learned to fly the hard way—on his own cash. I worked as a machine operator in Chicago to save enough money to take lessons. First I flew at Chicago Municipal and after that at Harlem, Elmhurst and Westchester. I bought an Aeronca C-3 in 1938 for $450 but I didn't put together enough hours (*Continued on page* 78)

Take-offs and landings are over trees but level turfed runways are 1,800 to 2,000 feet long.

So We Bought a Glider . . .

By DON ROSE

Aviation Editor, Philadelphia Evening Bulletin

THREE boys went away to the wars from our house. Two are back (the other soon will be) considerably larger and fussier than they used to be. In their absence three spinster sisters have spread themselves and their belongings around the house, taking over the best bedrooms and other comforts of home. They are staying put, like displaced persons who won't go back where they came from. The veterans are coming home to find no place to lay their battle-scarred heads, except a sleeping shack in the garden and a couch in the rumpus room.

Gone are the days when I could sleep them three in a room, or on top of one another in double-deck beds. They are grown men, better than six feet tall and fussy for privacy. Also they are loaded down with duffle. The post-war wardrobe of a *Superfortress* radar officer occupies three times as much space as my own. An ex-sergeant of the AAF medics owns less secondhand clothing but more souvenirs.

So we had our own housing problem. The veterans firmly refused to re-enlist in order to solve it. They had brought one of the war's chief problems home with them—they wanted *lebensraum*.

That's why one of them was sent off to Tobyhanna, Pa., last August, with a blank check and a certification from the War Assets Administration authorizing him to buy a CG-4A glider. More than 1,100 of these surplus vehicles were sold (one to a customer) at Tobyhanna within 36 hours. The price was $75, a pretty reasonable figure for a cargo glider which cost $22,500 to build and that came crated in 7,000 board feet of very nice lumber. That's what we thought, anyway.

You get it by now, no doubt, that I have no use for a glider which needs a *Skytrain* to tow it and is not approved for commercial use anyway. It might be a valuable machine for dropping a dozen men into enemy territory, or delivering a jeep or gun where one is needed. For any other purpose the glider itself isn't worth much.

But not its crating. You can build a bungalow with 7,000 board feet of lumber, or a sizable addition to an existing dwelling which will provide living quarters for ex-GIs who want a place to sleep. So, we bought a glider.

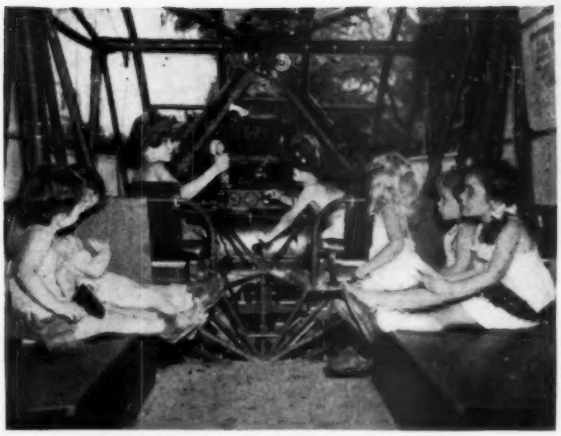
Right away we found that a glider in Tobyhanna is a bit unhandy for building bedrooms in the suburbs of Philadelphia, 90 miles away. Five crates hold the glider and the least of them weighs two tons. The largest, containing the

"Glider Wing" of the Rose home includes a new dining room, a large bedroom, a porch and balcony. The 7,000 board feet of crating was used, but most of the glider (right) is still left.

The most valuable part of a surplus glider may be crate it's packed in.

inboard wing sections, is 25 feet long, 12 feet wide and five feet thick, and weighs over three tons. The whole business could have been shipped by freight for about $285. But then it would have been stranded on a railroad siding, half a mile from home, almost as much of a problem as it was in Tobyhanna. Imagine my embarrassment if our truly rural freight agent had called up one morning and reported: "There are 12½ tons of glider waiting for you on the siding, on two flat cars. Demurrage will be $5 for the first day and the rate increases every day."

So the crates came by truck, one at a time. That cost $200, plus a $10 license fee for hauling oversized packages on the Pennsylvania highways. Also required were the services of two sets of block and tackle, a steel cable, two stout maple trees to hitch them to, and enough manpower to build a pyramid. The (*Continued on page* 82)



As a playhouse for neighborhood kids, the glider is wonderful, but it's a trifle large, with 48½-foot fuselage, 85-foot span.

More than 1,100 surplus gliders were sold at Tobyhanna, Pa., last August for $75 each. Each glider filled five such crates.

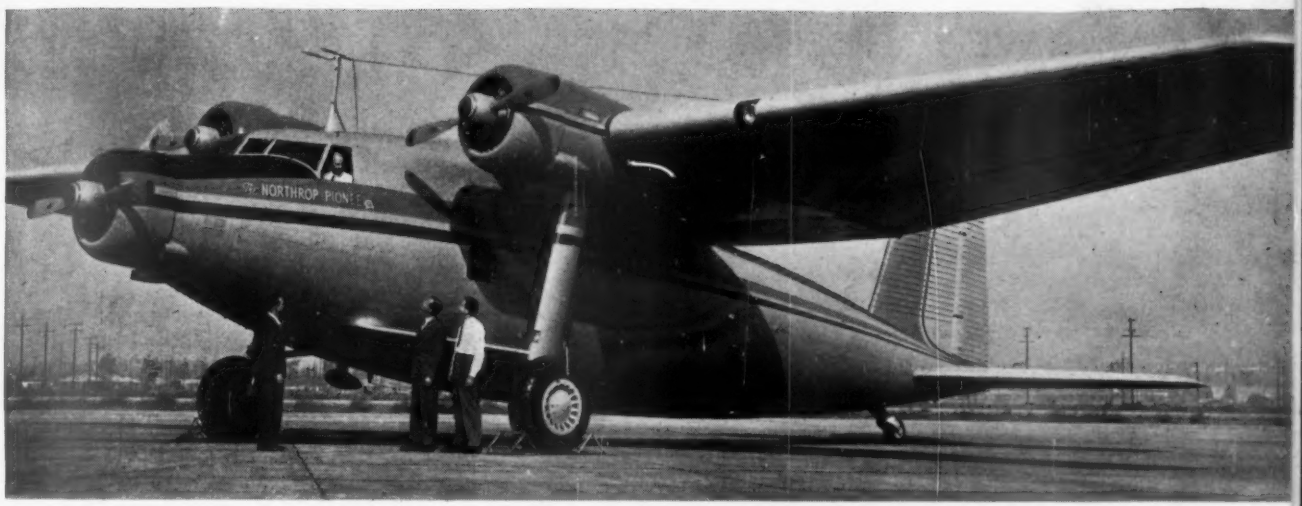
Unloading the crates from oversized trucks required a 12-ton railroad jack. Smallest crate weighed two tons; largest three.

HAVE YOU SEEN?

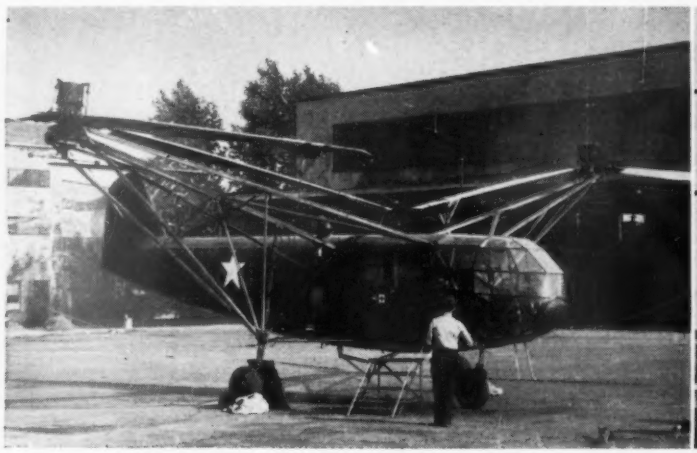
Vought XF6U-1 is the new experimental Navy jet fighter now being tested. Note large wing tip tank.

Fulton Airphibian has 150-h.p. engine, cruises 400 miles at 110 m.p.h. in air, gets 25 miles per gallon as car. One person disconnects plane from car in five minutes. Pending CAA acceptance tests, production is planned in Danbury, Conn.

North American XFJ-1, another experimental Navy jet fighter, can fly over 500 m.p.h., is designed for carriers. Its wing span is 38 feet.

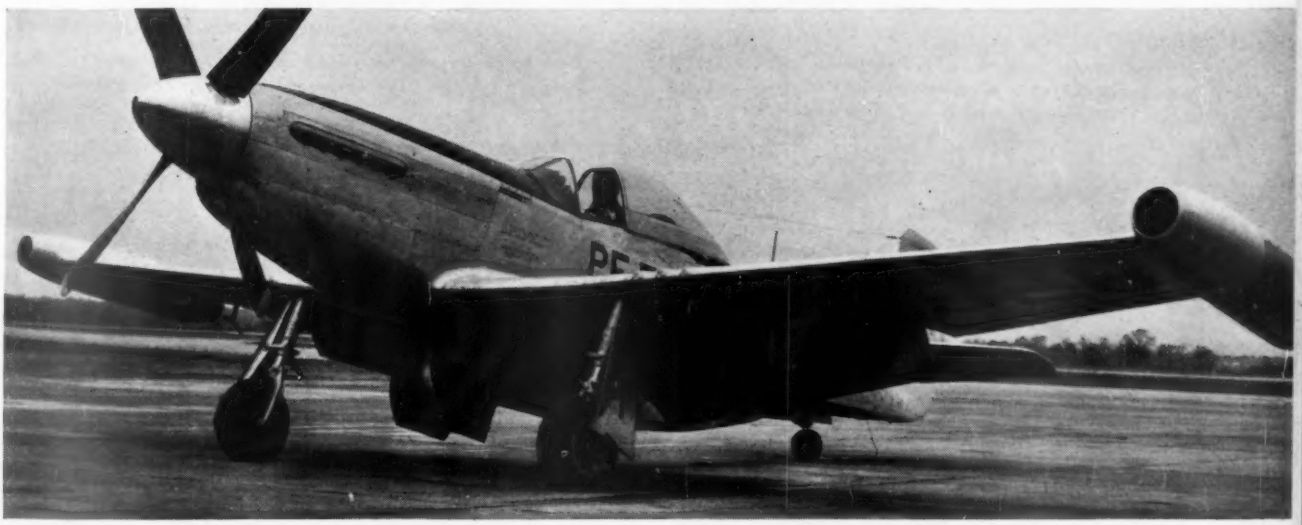


Northrop Pioneer prototype has just been completed, will soon undergo flight tests. It has three 600-h.p. engines, will cruise at 150 m.p.h., lands at 62. Designed to replace old Fords in South America, it will carry 25,000-pound gross weight



Novel German helicopter is Focke-Achgelis Fa-223. It has twin rotors, 1,000 h.p., can carry 10 men. Gross weight is 9,500 pounds, range 265 miles.

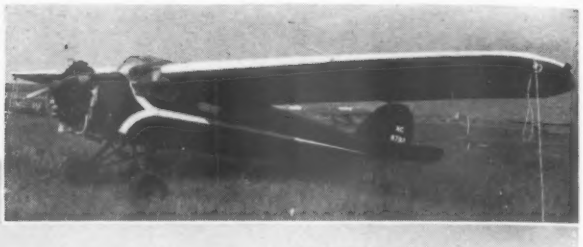
Bendix Model J is a new four-place helicopter with 450-h.p. engine. It has counter-rotating rotors but no steering tail rotor.



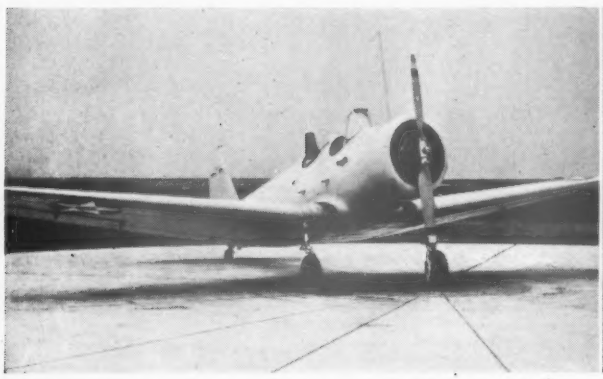
Ramjet engines have been tested on many existing AAF planes, including this Mustang. Engines mounted at wing tips give more speed than any other power plant except rockets. Ramjets will not operate from standstill, must get initial boost.

HAVE YOU SEEN?

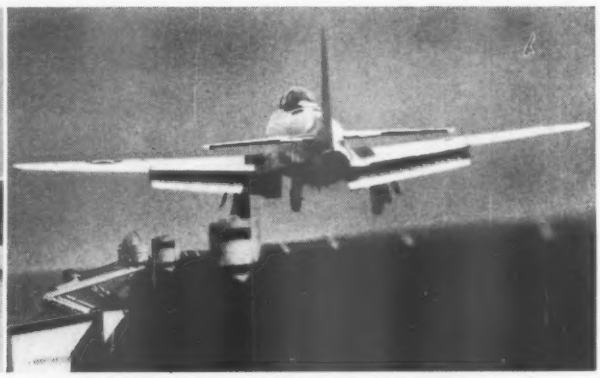
(Continued)



New Cessna 190 looks very much like pre-war Airmaster, but has larger engine, spring-steel landing gear and is all-metal except for fabric-covered fuselage. Price: about $13,000. Old Cessna in inset is 18 years old, has "bubble" hatch.



Experimental Naval Aircraft Factory trainer, XN5N had 320-h.p., cruised at 101 m.p.h. Gross weight was 3,370 pounds, span 42 feet.



P-80 on carrier was borrowed from Army for jet fighter tests, flown by Marine ace. This is catapult take-off from deck of the FDR.

Sikorsky S-52, new light helicopter (shown beside larger S-51), has 178-h.p. engine, cruises at 85, carries two, has metal blades.

Curtiss XBTC-2 is new experimental bomber-torpedo plane with 3,000-plus-h.p. engine, counter-rotating prop. It is single-place.

LONDON LETTER

By Maj. OLIVER STEWART

British Authority, Editor of Aeronautics

SIR ROY FEDDEN is always ready to set his own technical reasoning against the prejudices of the rest of the world. When he was with the Bristol company he faced long and fierce opposition to sleeve valves for high-powered, aircooled, aeroengines. But the war records of engines like the *Hercules* showed he made sleeve valves work well

We can be certain there is solid technical reasoning behind the special features of the new 160-h.p. flat six engine which made its first public appearance at the Paris Aero Show on November 15. It is a "rolled out" engine, flatter and thinner than anything else of its power. It also has fuel injection.

The Roy Fedden Six can be submerged in a wing only 14 inches thick. It has, of course, sleeve valves and it is to be available in both ungeared (160 h.p.) and geared (185 h.p.) versions. Cylinder displacement is 323.43 cu. in. and compression ratio eight to one.

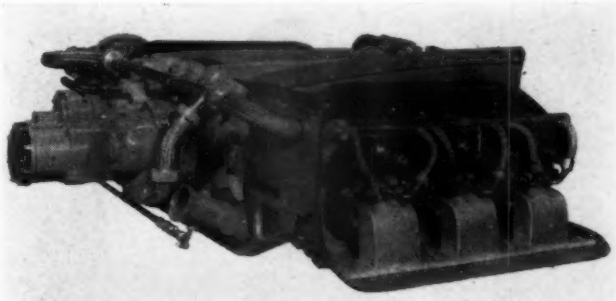
The flat six and a bigger engine, a 1,350-h.p. propeller turbine unit, are being made at Fedden's works near Cheltenham, in Gloucestershire. Interesting middle-sized personal aircraft are already being designed around the flat six which is shown in the photo below.

New Name, Same Plane

Tipsy as a name always sounded strange to English ears and the decision of the Fairey Company to change it to *Belfair* was probably right. But the aircraft remains as it was; a two-seat, side-by-side, low-wing monoplane which is powered with a 62-h.p. Walter Mikron engine.

A *Belfair* was flown from Belgium to Paris for the show. It had been built by Avions Fairey, of Gosselies, Belgium, a company which, like the Tipsy Company, is a subsidiary of the Fairey Aviation Company, Ltd., of Middlesex, England.

The *Belfair* has a cruising speed of 100 m.p.h., a ceiling of 20,000 feet and a normal range of 466 miles. Weight empty is 540 pounds and the wing loading is 8.5 pounds per square foot. Wing span: 31 ft. 2 in.



Fedden Flat Six is new British engine which will fit inside a wing only 14 inches thick. This 160-h.p. model is built for twin-engined pusher plane but tractor designs will also be manufactured.

Royal Air Force Fashions

The most exaggerated feminine fashions (at which men like to jeer in a superior manner) are far from being as fantastic, irrational and generally absurd as the costumes in which the military male likes to deck himself on ceremonial occasions. The service uniforms on the Royal Air Force stand at the Grand Palais excited a great deal of earnest attention even before the Paris show opened, as their object was to summarize the history of the air arm in Britain. The French are taking an intense interest in both U. S. and British service aviation.

The United States, however, was not represented on as large a scale as had been hoped. Your correspondent, when in Paris just before the opening, heard many expressions of regret by French people that a larger space had not been reserved for American aviation.

British Air Club Flying

Great efforts are being made by the Royal Aero Club—chairman, Whitney Straight; secretary-general, R. L. Preston—to unify the flying club movement in Britain. The associate membership scheme is making headway and its effect will be to bring all club members together and to give them much greater power in dealing with government departments.

Lord Londonderry, a former secretary of state for air, has loaned Londonderry House, in Park Lane, to the Aero Club on very easy terms. This house, once the center of magnificent, semi-official dinners where the fates of diplomats and even of governments were decided, will now be a center of the private flying movement in Britain.

There will be departments providing route information and maps, dealing with customs carnets and other documents, and obtaining passports and, so long as they are still required, visas.

But the real trouble with the clubs is still shortage of suitable aircraft at low enough prices.

Speed Terminal Transportation

The time required to transport passengers from airports to city areas has long been a major aviation problem. But some valuable statistics concerning such transportation needs eventually should result from recent developments at Gatwick Airport — about 25 miles south of London —which may make it one of London's chief charter service airfields. A modern approach to this old problem is the aim of the Gatwick setup.

Gatwick was a bold experiment when it was created well before the war, for it was designed to use railway instead of road transport for the terminal section from the airport to the center of London. A subway leads from the airport apron direct to the platforms of the railway station. Electrified trains do the journey from Gatwick to the heart of London in something less than 30 minutes.

Gas Turbines Go Abroad

One of the unexpected purchasers of British gas turbines is Soviet Russia. She has bought 20. Meanwhile the Paris Show has led to an agitation in the French aviation press for the purchase (*Continued on page* 100)

Aerobatics are the best method of developing pilot precision.

Don't Waste Your Flying Time

By AL HANSEN

A FAMOUS pilot once said of the novice flyer: "Every minute he spends in straight and level flight is a minute wasted." In the main, most competent pilots will agree with this statement. Look back through your own log book to see the many hours of wasted flying time you have entered.

The average pilot, after becoming just proficient enough to pass a Civil Aeronautics Administration private flight test, feels that he is now a hot-shot flyer. As a general rule, his flying becomes worse thereafter rather than better. He sees no further cause for the precise technique CAA requires and he buzzes nonchalantly around the country in his plane with little regard for accuracy.

If the nose gets off 10° or if he gains or loses 100 feet in his so-called straight and level, it makes little difference to him. Torque in his climbs doesn't bother him and stick, rudder and throttle co-ordination go to pot. He flies as he pleases and his pleasure is reflected in sloppy technique and a careless attitude.

The pilot who takes this attitude is missing most of his fun. The real joy in flying is in continually trying to perfect your technique and your judgment. There is no place in the air for a sloppy pilot.

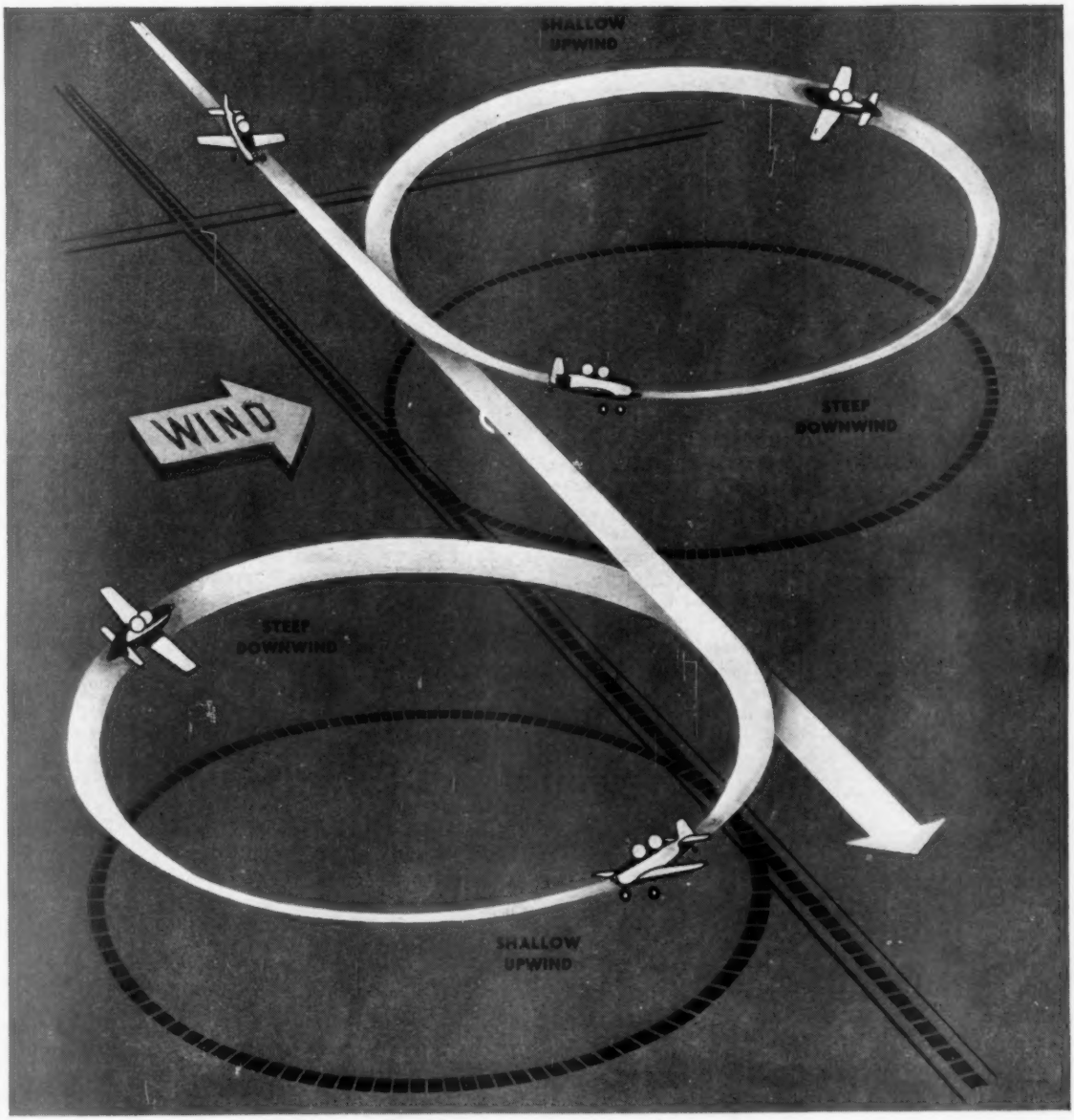
Every pilot who has soloed can better his flying technique. He would not have soloed unless his instructor had been convinced that he, as a student, had sound judgment and at least average ability. With this much to start on, any pilot can, by being continually dissatisfied

with his flying, be his own teacher. The only required attribute is the ability to analyze his every maneuver, to pick it to pieces and see if it is fundamentally correct.

In every angle of bank, for instance, an airplane has a certain rate of turn. In a shallow bank the nose turns very slowly. In a steep bank it swings very rapidly. Consequently, when rolling into a turn the nose should start its travel as soon as the bank begins, and should increase in rate of travel as the angle of bank increases, until finally the desired bank is attained. "Shucks," you say, "anybody knows that." True, anybody does know that, but have you analyzed your turns lately to see if this sequence of events really takes place?

The airplane won't turn of its own accord. It takes judicious use of the stick and rudder to accomplish this accurately. Because of the unequal drag caused by the lowered aileron being in a positive pressure area and the raised aileron in a negative pressure area, the high wing of a bank has more drag and, consequently, proportionally less speed than the lowered wing as long as the aileron is applied. This slows down the rate of travel of the nose in the turn entry, and must be compensated for by adequate use of the rudder. After the desired angle of bank has been reached and the aileron pressure relaxed, of course the rudder pressure should cease. The only purpose of the rudder in a turn is to overcome the initial yaw caused by this unequal drag of the ailerons.

Another thing generally overlooked in "everyday" flying is proper drift correction. Every airport in the interest of traffic safety usually has a definite traffic pattern often layed out so that the pilot will have to make good a ground track. Imagine the con- (*Continued on page* 101)



Precision flying can be learned only by frequent practice of such basic maneuvers as crosswind eights along a road. Though essentially not eights but a series of matching circles, this flight pattern emphasizes the necessity of wind correction.

I Learned About Flying From That! NO. 87

Author, shown on a Cornell, learned mountain flying is tricky.

By SAM A. PATCHETT, Jr.

A novice at mountain flying, this pilot hit a down-draft—and bang!

I HAD already made four cross-country deliveries for the Piper Aircraft Corp. (to the south and middle west), when Ed Jahelka assigned me a *Cub* to be flown to an airport near Ogden, Utah. This was the trip for which I had been waiting! A delivery 300 miles the other side of the Continental Divide meant I was to get my first mountain-flying experience.

Everything was routine until the second day out. I took off from Cheyenne where I had remained over night. Already the gradual slope of the Great Plains had accustomed me to higher altitude take-offs and landings. But Cheyenne is 6,000 feet above sea level and the effect of increased altitude on the performance of the *Cub* became most noticeable. The air was hot and even with a paved runway and a 16-m.p.h. wind, the lightplane took considerable time getting into the air and climbing the first couple of hundred feet. But the thermals were strong and, once in the air, I had little trouble climbing.

As I rose slowly to the 10,000-foot altitude required to clear the Laramie Range, the scenery became increasingly beautiful to my midwestern eyes. The engine was humming; my navigation was on the ball. Mountain flying is really something, I began to think and just about as easy as flying over the plains of my native Illinois.

The airway I was following bears northwest out of Cheyenne until it reaches the small town of Rock River, Wyo. There it turns almost due west toward Rawlins, Wyo. Rock River is 80 miles from Cheyenne and Rawlins is 55 miles from Rock River—a total distance of 135 miles. Under normal conditions, that would be an easy nonstop hop for a *Cub*. I intended, therefore, to fly on to Rawlins. If it became apparent that I couldn't make it, I could land just north of Rock River, at Medicine Bow, and refuel.

It took 1 hr. 20 min. to make Rock River and I naturally surmised that I could make the remaining 55 miles with the 1 hr. 40 min. gas supply still in my tanks. So I changed my heading and set course for Rawlins.

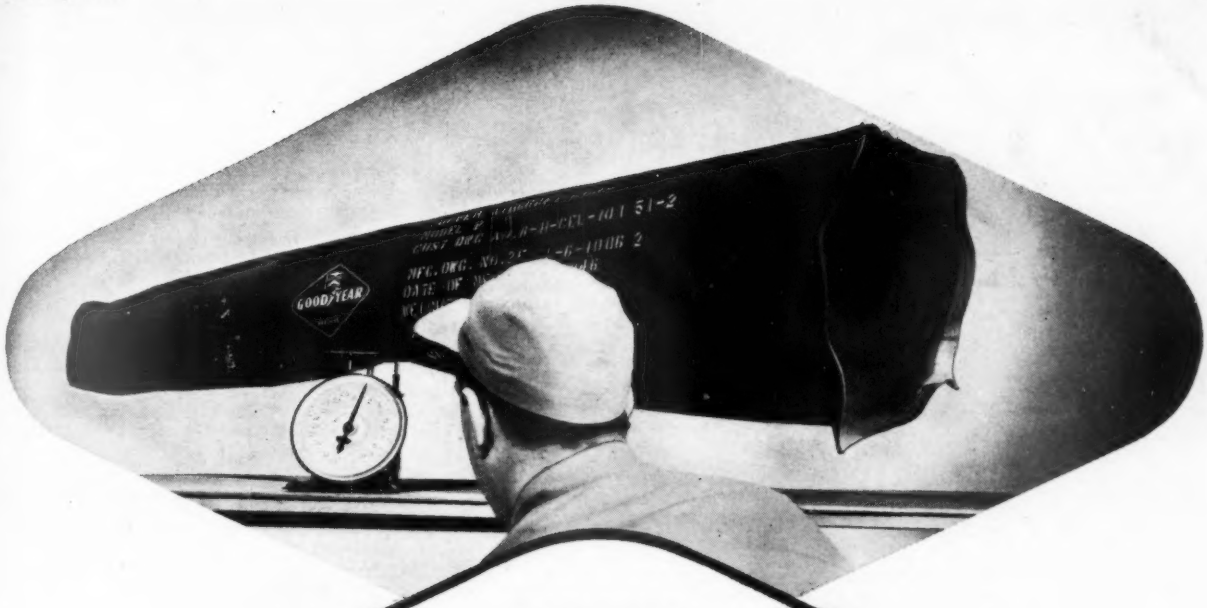
The terrain became more and more rugged as I continued west and I began to lose some of that calm which had marked my attitude toward the trip so far. I busied myself with navigation as check-points became almost extinct. Finally, on crossing a mountain road, I got a good check on my position and was able to compute my ground speed—35 m.p.h. I still had 20 miles to go and had now been flying 2 hr. 20 min. Things were, indeed, taking a serious turn.

I knew it would be a tight squeeze to make Rawlins; I might not even be able to make a CAA field six miles east of there. Hoping that perhaps there was a more favorable wind below, I decided to drop lower than the 1,500 feet above the terrain which I had been holding.

A few miles east of the small town of Fort Steele, Wyo., I dropped down within 500 feet of the Union Pacific railroad tracks and followed them into a little valley. Here, I thought, I would get some protection from the winds which were playing around the mountain peaks.

Things progressed all right until I reached a point about halfway through the valley where the railroad goes through a pass about a quarter-mile wide. Here hell broke loose with a suddenness that took me by surprise. In all my five years of flying I had never encountered such turbulent air. I had to battle to keep the *Cub* on a reasonably even keel. Then suddenly I was into a nearly vertical bank despite full opposite aileron. Even full power from the engine didn't help my plight and I dropped as if strings from the ground were pulling me down. I knew I was going to crash—there was nothing to prevent it. I couldn't land;

(*Continued on page* 100)



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hold more gas - weigh less!

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AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters are: 1319 F Street N.W., Washington 4, D. C. Mmbers also receive a special "AOPA" edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

SAFETY DRIVE

THIS year will see the most comprehensive lightplane safety drive in aviation history, with AOPA playing a leading role.

Keystone of the campaign by the association will be the widespread publicity given to accidents picked from the files of the Civil Aeronautics Board Safety Bureau by CAB experts. The crashes to be publicized will be the type which caused the most trouble during the preceding month. Working closely with these experts, AOPA will publicize the accidents in airport posters and two-page spreads in the AOPA Pilot, which may also be used for poster or bulletin-board purposes.

Photos showing crack-ups will feature the poster campaign.

Experts who will guide the campaign include Jesse Lankford, chief analyst of the Safety Bureau and long an authority on lightplane safety; Paul Gillespie, head of the Board's accident investigation work, and Harold G. Meyers, also an accident investigation worker.

Chief early-1947 targets, already chosen on the basis of late-1946 trends, will be lowflying accompanied by carelessness and stunting, and students carrying passengers. These were the worst accident causes during the early winter and are constant hazards according to lightplane accident records.

INTERNATIONAL FLYING

Another AOPA campaign apparently destined to figure in lightplane news during the coming year will be the treatment of private flyers by the Provisional International Civil Aviation Organization (PICAO).

Year-end activities indicate, according to association observers, a trend toward wrapping international private flying in the red-tape formerly suffered here. There is even danger that some of the old, U.S.-brand tape would be wrapped around pilots in this country as a result of PICAO meetings at Montreal in December.

Queried as this went to press, Robert D. Hoyt, co-ordinator of international regulations of the CAB Safety Bureau, said that he believes the CAR will have to be revised in line with PICAO rulings. Other opinion is that PICAO rulings will apply almost exclusively to foreign travel.

Either way, AOPA general manager J. B. Hartranft, Jr., viewed the PICAO trend toward more regulations with alarm and promised a vigorous campaign against them if they prove a hindrance to U. S. lightplane activities in 1947.

Stiffest fight seems to be developing concerning increased air traffic rules and licensing requirements, with PICAO tending toward regulations which consider airline and military needs but have little or no consideration for private pilots.

"Repudiation of the agreements will be mandatory if they interfere with private flying in this country or turn back the clock on present U. S. rules," Mr. Hartranft declared.

RADIO RANGES

A formal request to the Civil Aeronautics Administration to continue its four-course radio ranges indefinitely was made recently by AOPA following meetings of the Radio Technical Advisory Committee at which the Association was represented by Karl F. Kellerman (AOPA 19348), radio expert.

Two reasons were given for the AOPA request. In the first place, it is pointed out that no equipment is now available suitable for use by lightplanes with the omnidirectional beam, now being installed by CAA and, assumedly, standard airways equipment five years hence, at which time lightplane pilots would be left without adequate radio aids.

In the second place, with the present economy moves in Congress, it is feared that appropriations for the maintenance of the four-course ranges might be withdrawn. Appropriations for omnidirectional beams, on the other hand, have already been made and earmarked.

Either way, it is pointed out, the lightplane pilot stood to lose adequate radio aid on the airways, and the AOPA request was therefore made formal.

No reply had been made by Government officials to the Association request as this went to press.

TAXES

Herewith for the first time in capsule form is the latest in discriminatory gasoline taxes against personal aircraft—now found in 10 states:

KENTUCKY—Tax is five cents per gallon but the law on refunds is stated in such a way that the little guy is under a big handicap, including gobbledegook legal phrases and a $100 to $1000 bond.

LOUISIANA—Personal aviation pays seven cents per gallon but interstate airlines are exempt.

MICHIGAN—Tax is three cents per gallon but interstate airlines get a refund of one and one-half cents a gallon.

MINNESOTA—Tax is four cents per gallon. Refunds are permitted in a complex fashion starting at 50,000 gallons. The law may not help anyone. certainly not the lightplane public.

NEBRASKA—Tax is five cents per gallon. Air school users, however. get full refund.

NEW MEXICO—Tax is five cents per gallon. No refunds, though, if you don't buy 50 or more gallons at a time.

PENNSYLVANIA—Four cents a gallon for everybody but the airlines pay tax only on the distance they fly in the state.

SOUTH CAROLINA—Six cents a gallon on all except U. S. Army primary aviation schools, which get full refund.

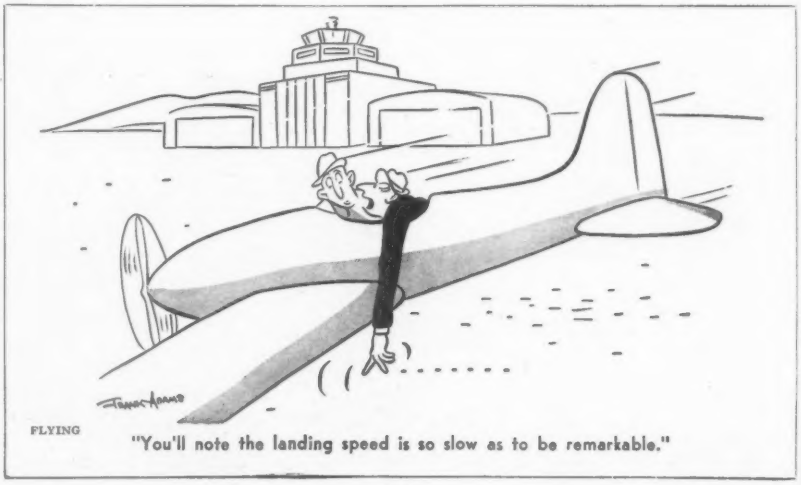
VIRGINIA—Tax is six cents a gallon but "full refund is granted to interstate operators of aircraft." Others may get two cents a gallon refund.

WEST VIRGINIA—Tax five cents a gallon. You get full refund if you buy 25 or more gallons.

WYOMING refunds two cents a gallon only to extremely large users, but the tax is used to develop aviation.

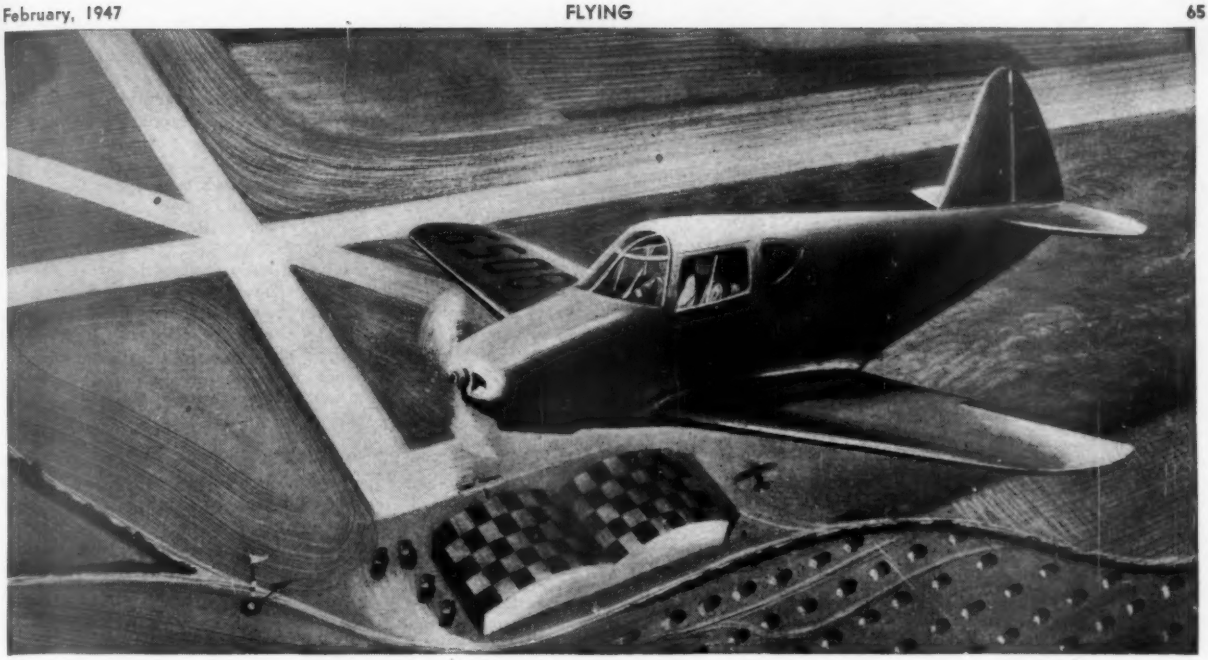
MEMBERSHIP

The year 1946 was the biggest in AOPA history, year-end reports indicated. Membership was doubled and the year-end trend continued good, November additions totalling more than a thousand—twice the figure for November, 1945. END



FLYING

"You'll note the landing speed is so slow as to be remarkable."



More and Better Airports—

YOU WANT 'EM . . . WE WANT 'EM!

As interest in aviation grows by leaps and bounds, everyone who flies or wants to fly looks forward to a day of better, safer landing fields—faster in-and-out service—highest quality aviation products available at more airports.

That's Socony-Vacuum's goal, too. Right now, we're working closely with the CAA— offering civic and business groups complete aid in airport planning and construction.

Already, over 1000 airports coast-to-coast feature Mobiloil Aero for finest engine protection . . . Mobilgas Aircraft, a special 80 octane, clear gasoline for personal planes. They're products of the same refining skill that makes 20% of all aviation fuels.

Get the most from flying. Land at fields that show the Flying Red Horse Shield!

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THE LIBRARY

U. S. ARMY AIRCRAFT, 1908-1946, edited by James C. Fahey; published by Ships and Aircraft, New York, in 1946. 68 pages. Price $1.

This is the most colossal job of compilation we've ever seen. There is so much sheer factual information in this little book about practically every aircraft the AAF ever bought or thought of that it's worth the price for no other reason than that it is a collector's item. One thing is sure: 99 per cent of all the men in the AAF have never known a fraction of the information contained in this book.

Mr. Fahey appears to have taken extreme care to assure accuracy. If you want to know the difference between the P-51D-NA and the P-51K-NT, it's here. If you're curious as to who has the contract for the XB-48, you'll quickly find that it's Martin. As an historical document this book is doubly valuable. Every bomber from the XB-1 of 1926 to the B-50-BN of 1946 is described, for example. There's a complete table, with full details, listing the airplanes procured by the Signal Corps between 1908 and 1917.

There are dozens of photographs, tables on contemporary aircraft engines, and an excellent page explaining the present AAF aircraft designating system down to the smallest detail. In other words, it will cost you only $1 to become an expert on the AAF almost overnight.

—MAX KARANT

VITAL PROBLEMS OF AIR COMMERCE, Edited by Lucien Zacharoff, published by Duell, Sloan & Pearce, Inc., 270 Madison Avenue, New York 16, N. Y., in 1946. Price $3.

Avoiding personalized prediction, Editor Zacharoff has rounded up opinions of aviation leaders into a chaptered debate. His book comprises a series of carefully selected articles in which aviation and Government big-wigs present the merits of their respective air-policy positions.

Much of the discussion has to do with integration of air, rail and steamship services, a problem that Zacharoff properly recognized and stressed. Pros and cons are fairly impartially presented. But the reader is left with a sense of indecision as to just which combination will be the most effective in future air commerce.

Since the U. S. has withdrawn from the Five Freedoms pact, several arguments—or chapters—touching upon international air carriers lose consequence. And Pan American's very recent applications for domestic routes do not go too well with Col. J. Carroll Cone's fervent plea to protect that line's past monopoly.

In the main, however, private flying does get treatment. Federal programs for the development of airports—simple but adequate rules governing the private flyer—training of pilots who ultimately will fly the commercial air giants—contemporary thought concerning all these are made quite clear. Perhaps a bit too much space is given to problems of private pilots in the eastern seaboard area—especially New York City.

One of the most forceful arguments presented is one on behalf of lighter-than-air ships by Rear Adm. C. E. Rosendahl, U. S. Navy. He compares the old *Hindenburg* and the Mars *Clippers* as to payload, range, and other operating figures for land planes which now comprise the bulk of transoceanic equipment. Rosendahl's long experience with airships gives authenticity to his claim that airships will find a definite place in tomorrow's air commerce.

Legal problems that confront the industry today are well presented, though many are subject to constant change.

Since each authority presents only his own opinion, Zacharoff never gets out on a limb. Chief value of his work is that it calls attention to exactly those obstacles which must be surmounted if aviation's progress is to continue.

—LAWRENCE KEIL

FLYING

"It's your wife . . . She doesn't think you're flying right."

SHORT VIEWS

AERONAUTICAL NAVIGATION, by Charles A. Zweng. Published by Pan American Navigation Service, 12021 Ventura Blvd., North Hollywood, Calif. 198 pages. Price $3.

The private pilot would do well to purchase a copy of this book and study it. While it will not make him an expert navigator, it will give him a far better understanding of cross-country flight.

Zweng explains simply and clearly the use of the Weems plotter, charts, and the Dalton navigation computer. He discusses navigation instruments, their uses and limitations. Celestial navigation is entirely eliminated from the text.

A goodly section of the back of the book is given over to multiple choice and question and answer quizzes, handy devices by which the reader can check what he has learned. The book is recommended for use by schools teaching dead reckoning, pilotage and radio navigation.

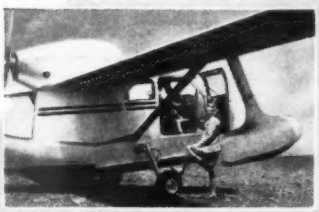
ABC's OF FLIGHT, by Paul H. Housel. Published by Merritt Wells Pub. Co., Warwick, N. Y. 82 pages. Price: $1.

Written by a flight instructor, this text supplies excellent material for the beginner or for the commercial pilot studying for an instructor's rating. All maneuvers used in the private pilot's examination are explained in detail. In addition there is a simple discussion on the theory of flight and on aircraft structure. END

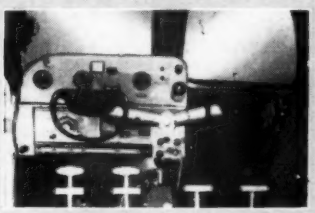
Only the Seabee offers all this!

The most advanced personal plane of the post-war era...and not an expensive ship either to buy or fly...this versatile 4-place all-metal amphibian assures power, range and conveniences never before available, except in ships of far greater purchase and maintenance costs. ¶ Its flexibility of operation from either field or stream adds a hundred-fold to this vital safety factor...and here indeed is the first, truly modest cost, all purpose personal plane, for sport or business.

¶ The Seabee is fully proved by months of careful test...see it...fly it...by all means buy it. You'll discover new standards of beauty and performance which have no equal at its price . . . now completely equipped. . . $6000. F.A.F. Farmingdale, Long Island, New York.*



• *Easy entrance through sturdy salon-type doors...spaciousness of cabin and luxurious upholstery are emphasized.*



• *Dual control units and standard instrument equipment . . . also wide angle of vision...from roomy front seats.*

• *Full swing of utility hatch allows fishing from the bow plus easy removal of sport or other equipment from ship.*

**Hartzell Controllable-Reversible Pitch Propeller . . . full "Cross Country" Instrument Panel and Hallicrafters Two-way Radio . . . top off the exceptional accessory equipment now standard in the SEABEE. Republic Aviation Corporation, Farmingdale, Long Island, N. Y.*

Seabee

Product of REPUBLIC AVIATION

Makers of the Mighty Thunderbolt

The Pilot's Missus

(*Continued from page 34*)

tricked into an airplane, gripe about a cotter key snagging their nylons. They can't understand why a 65-h.p. job hasn't the plush of a DC-4. And they are usually flying versions of the automobile's back-seat driver.

On the other hand, this type may never note either bad or good flying techniques. Although they may enjoy the ride, they look vague when the male points out how nicely he handled that cross-wind take-off or his smooth precision when that other plane cut him out of the landing circle. To them, a trim tab is a dohinkus—and the same goes for every other gadget in the plane. This type is responsible for the hubby who spends his time with the guys—and perhaps the gals—that understand *his* language.

Sounds hopeless, doesn't it? If a gal can't get interested in flying or put up with airplanes, maybe she has no business marrying a flyer. It could spell trouble. If she gets a husband and then he gets aviation, then that's an equally difficult situation.

But there are wives who accept aviation, go along with the man of the house when he flys and perhaps themselves become pilots. They make themselves as comfortable as possible at airports and learn something of the terminology of flying. (These are the rare little gems.—Ed.)

Typical of these gals who try is a friend of mine who, when asked if she could fly, replied: "No, but I'm learning to sit."

Another girl claims that she hasn't logged an hour of flying time but has "432 hours logged as an airport widow." And what does she do with 432 hours of airport widowing?

"Oh, I've learned. I come prepared. I have magazines, books, darning, letters to write, fruit, cookies and sometimes a thermos. When I get tired of sitting, I wander around and talk to people."

I suppose I am an airport widow of a sort. My husband has logged 3,500 hours and I've spent a large part of that time waiting around for him. So the following suggestions aren't something dreamed up on the spur of the moment.

Dress appropriately. Few gals would appear at a beach party in a formal. So why appear at an airport dressed in "Sunday best," high heels, fancy hair-dos, and "impressionable" fingernails. An airport cannot be compared to a fashionable supper club or a friend's home. Maybe a few large municipal airports could qualify, but your local airport, as a rule, does not go in for dress occasions. Their operators can't afford a doorman.

On the other hand, it isn't necessary to be sloppy, to look and feel like a hag. Tailored wool or flannel slacks, sweaters or a jacket are fine for cool weather. For summer, light-weight slacks, pedal-pushers or non-frilly blouses are always good. Shorts and halters around an airport can be both distracting and embarrassing.

The Army surplus overalls in either wool gabardine or nylon are very practical for those who fly. There are pockets galore for lipstick, comb, scarf, gloves, helmet, notebook, etc., so the purse may be dispensed with. Of course some may object that the overalls were designed for men and don't do a terrific job for the gal with a figure. But, they do give good protection against dirt and grease—the woman's pet gripe. Flat shoes that won't leave a gal teetering on a wing or falling off a step help considerably. And remember, a simple hair-do takes less time and trouble to comb out.

And another thing. If a gal expects a man who flies to take an interest in her activities, she might at least learn some of his flying lingo. Fuselage, aileron, torque, manifold pressure, air foil and spars are so much mumbo-jumbo to some sweet young things. But terminology is just as important in flying as it is in golf, music, art, cooking, sewing or any other sport or activity.

When hangar flying rears its head on a social occasion—as it always will when two or more pilots get together—*don't* groan and start talking about clothes. Listen in and try to follow the flow of conversation. When a word is used that isn't clearly understood, ask what it's all about. It not only adds to your accumulation of terms, but sometimes flatters your beloved's ego.

When around planes become familiar with the controls. Learn where the brakes and switches are and how to use them. It may come in handy some time. Learn how the throttle works so that hubby can crank the plane while you sit in the cockpit. Running a lightplane's engine isn't any more difficult than running a car's—it's just different.

In the air, look for other people's planes, learn what the traffic pattern is (it isn't accidental that planes take more or less the same route into or out of fields). Become familiar with the instruments and where they are "redlined." If you aren't interested in the mechanics of flying, learn navigation, map-reading, or meteorology.

"Women take too much junk with them for a weekend," men complain. Learning to pack with a minimum of space gets to be an art. Eliminating the frills takes time, but it's well worth it. By the way, solid perfumes or colognes (if necessary) are excellent for flying trips. You should hear a hubby's howls if a favorite perfume becomes uncorked and scents all the clothing in the suitcase.

Learning the parts of the plane and what they are supposed to do helps make the cross-country trip (or even hangar flying) more interesting.

A little aviation knowledge helps, too, when a pilot tries acrobatics in a plane you think isn't stressed for it. A question like "What's the wing loading for this plane?" usually makes him straighten up and fly right. Learn to distinguish between flying and the glamorized article that is handed out so freely.

Of course if the wife is interested in flying that means the finance problem is half solved. She's the gal who knows how to squeeze money out of the family budget to buy or rent a plane or how to re-do the den as an airman's hangout with airplane models, maps and pictures.

But, to get the gal interested, the airports should meet her half-way. The husband may feel he isn't in his element until said element is covered with grease and oil, but that isn't the wife's element! Airports should have neat waiting rooms, benches, chairs and a cafe or at least a hamburger stand. Rest rooms should be clean and plainly identified. If you think these rooms are standard airport equipment—just take a cross-country trip!

So there it is. The airport widow doesn't need to be a problem if she looks for the right solution to her own particular set-up. She can stay at home, sit at the airport or fly—depending on her attitude or ability to compromise. END

15 YEARS AGO

FROM the February 1932 issue of this magazine:

A Junkers transport had windows in the leading edge of its thick wings to provide necessary light for stowing the baggage and freight inside the wings.

First airplane constructed of stainless steel was christened the "Pioneer" at Long Island, N. Y. It was a four-place amphibian of the Savoia-Marchetti type.

Pilot Johnny Starr of Tulsa, Okla., was awarded a contract by the U. S. Weather Bureau to make daily weather observations. Flying 14,000 feet above Omaha, Nebr., each morning in a Spartan monoplane, he made readings of wind velocity, humidity, temperature and other weather data which the Omaha Weather office disseminated throughout the country.

The Nicholas-Beazley—a folding-wing, two place trainer—had received its Approved Type Certificate. It was equipped with a five-cylinder supercharged engine.

National Aircraft Builders Association had brought out a unique two-place lightplane with an exceptionally low fuselage. Its tricycle landing gear left the rear end of the fuselage just clear of the ground. The association claimed the plane would not ground loop since the two main wheels were back of the center of gravity. The front wheel was steered by the rudder pedals.

Blind flight training had become a compulsory part of the regular training at Kelly Field not only for protecting the pilot and planes but for increasing the fighting power of aircraft in time of war, officers of the Field revealed. All combat planes had instrument flight equipment.

Flying bombs and aerial torpedoes capable of carrying a ton of high explosives were predicted for future wars by Elmer O. Sperry, who assisted his father in developing the Sperry robot pilot.

Two British high-altitude explorers, Eustace and Oswald Short, were planning an ascent in an immense balloon to a height of 15 or 16 miles above the earth. Equipment included a special breathing apparatus and a radio transmitter for sending messages during the flight.

More Get-up More Go More Fun

WITH AN AEROMATIC* PROPELLER ON YOUR OWN PLANE

TAKE-OFF: With engine at full throttle, Aeromatic Propeller assumes low pitch automatically . . . gets plane off ground quickly, allows use of full take-off power.

CLIMBING: Aeromatic responds to natural forces . . . increases pitch automatically as air speed increases . . . gets plane to cruising level fast . . . on minimum fuel.

CRUISING: Aeromatic automatically maintains the most advantageous pitch . . . for top cruising performance on minimum fuel at any level up to critical altitude.

LANDING: Aeromatic adjusts its pitch automatically for a long flat glide . . . moves to low pitch instantly for a quick pickup if the pilot overshoots the field.

ONE-FOURTH SHORTER TAKE-OFF RUN! One-third higher rate of climb! Greater cruising range and speed! All with less fuel consumption, less engine wear! That's what you get from Aeromatic—"the propeller with a brain."

IT'S COMPLETELY AUTOMATIC! The Aeromatic Propeller is completely self-acting and self-contained . . . varies its own pitch automatically for peak performance all the way. There are no extra controls to "fiddle" with . . . no extra instruments for the pilot to watch.

WRITE FOR INFORMATION! If you own a new plane or plan to buy one, enjoy the extra advantages of an Aeromatic Propeller. Write to your aircraft manufacturer and see if you can have an Aeromatic on your plane. Or drop a line to: Koppers Co., Inc., Aeromatic Propeller Dept., 232 Scott Street, Baltimore 3, Maryland.

Custom-Tailored for the Planes they Fly

Aeromatic Propellers are available for most new private planes and are being installed on other makes and models.

The Propeller with a Brain for Your Private Plane

Aeromatic

Air Controlled Automatic Propeller

Licensed under patents of Everel Propeller Corp.

*Reg. U. S. Pat. Off.

K KOPPERS

Airlines vs. Private Flying

(*Continued from page 33*)

DC-3's and *Constellations* in the same traffic patterns," he said. "The *Constellation*, cruising at 270 m.p.h., overtakes the DC-3 very quickly and creates a problem for traffic controllers and pilots. With a variety of planes flying at all speeds from 60 m.p.h. to three times that in the same traffic pattern you have immense confusion and a situation that will inevitably cause accidents."

On the other hand, Hartranft says, his organization is agreeable to excluding private planes from busy airports whenever airline schedules reach the saturation point. "But," he says, "that point has never been reached except for short periods on certain days at a few airports."

He is proud of AOPA's record of safety and efficiency in handling large volumes of airplanes during mass flights. "We have landed and parked as many as 230 airplanes at Greenpoint, N. Y., and other places in a very short period of time, with no more facilities than a man with two flags to direct the pilots. We've never had an accident during landing operations. If we can do that I don't see why a busy airport can't handle a smaller volume of airline and private planes by planning their traffic patterns properly."

Hartranft sees an overemphasis on the part of most municipal airports on commercial operations all out of proportion to the number of aircraft present to be hangared, maintained and serviced. This he ascribes to economics. It is more profitable to load 1,000 gallons of fuel into an airliner than to service 100 private planes with 10 gallons each, or to rent a hangar to one airline than to operate a hangar for personal planes with multiple owners and numerous transients.

This, he claims, is a short-sighted view, because airports and airways compare roughly with highways and service stations. As personal flying continues growing, it will provide the same relative amount of traffic (and revenues) as private automobiles compared with the bus and trucking lines. Even now, he believes, although the figures cannot be proven, more seat miles are flown in private planes than in transports.

The airlines get preferential treatment in other ways than in their usurpation of major air terminals. The U. S. Customs Service is not prepared to handle travel across the borders except at airline terminals. Private pilots must channel through cities where customs men are stationed to process airline passengers. The AOPA is now dealing with the Government in an attempt to correct this condition, but has had no success thus far due to a reduction in the Customs and Immigration service operating funds.

One of Hartranft's major complaints is that there is no section within the Civil Aeronautics Board concerned exclusively with non-scheduled aviation, although almost everything done by the CAB affects personal flying.

The Civil Aeronautics Administration's long-pending airport bill has been passed, although the appropriation of Federal funds was cut sharply from the recommended $1,250,000,000 to only $500,000,000. The great bulk of airports to be constructed with this money and funds to be contributed by the states will be Class I and II, suitable for use by family-type planes and small transports.

The original provisions specified by CAA called for the construction of 3,000 airports, 2,900 of which would be Class I (1,500 to 2,500-foot runways) and Class II (2,500 to 3,500-foot runways). The other fields would be suitable for airline operation. The reduction in cost is more likely to reduce the complexity of the projected airports than the number of them, according to one CAA official.

The expansion of airport facilities is expected to further broaden the demarkation between the private flyer and the airlines, rather than to bring them closer together. New airports make flying more convenient and attract additional adherents, who will want to use the airways and municipal airports. Airlines and municipalities will take new measures to restrict personal planes to the smaller fields, and a feud, now only in its early stages, undoubtedly will become nationally important.

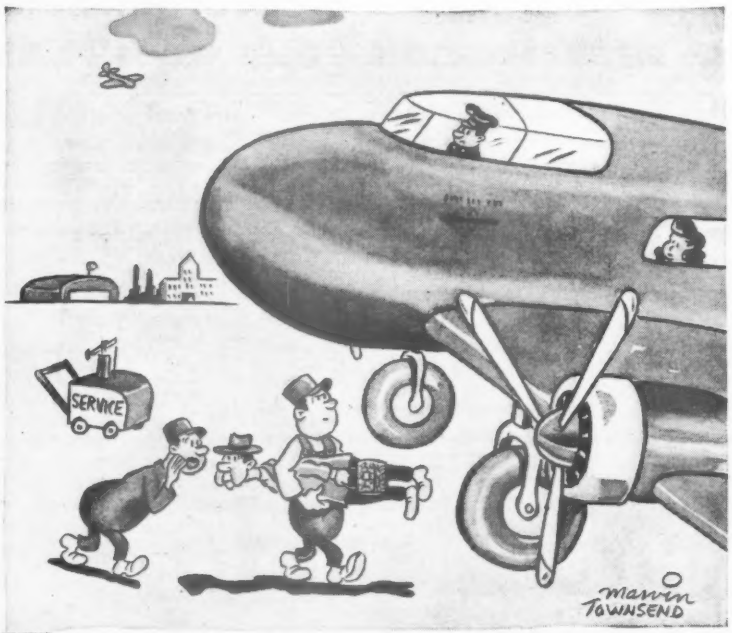
The airport problem is receiving much attention these days. In Washington, two lobbies, one representing the state aviation officials and another in favor of a federation of municipalities, are fighting each other for Federal airport funds. The National Aeronautics Association is surveying the landing fee situation to determine to what extent privately operated airports depend upon this source of revenue for their income.

The CAA has recently published two booklets dealing with airports. One covers the employment situation and the other advises about the planning, design, construction, operation and maintenance angles. The airlines vs. private pilots dispute being largely a matter of economics in airport management, the whole industry is hoping that sound management, new ideas and a larger volume of business will obviate the need for landing fees for non-scheduled operators. It is also hoped that it will be possible to have enough accessible municipal airports so the problem of segregation will solve itself.

As concerns the use of Federal airways, no problem now exists during instrument weather because so few personal planes are equipped to fly instruments. The situation is different for contact flight, although the problem is still minor. Often personal planes are found on the airways, despite the fact that there is an altitude separation maintained. Airline pilots also often complain that many private operators fail to observe airways regulations.

That this is a two-way complaint is testified by two recent accident investigations involving lightplanes and airliners, in which the CAB found that the airline pilots had failed to exercise proper vigilance.

With the situation between the airlines and private pilots in a state of flux, the only conclusions that can be drawn are that personal aviation refuses to take a back seat and that much study must be given the growing problems. There is room in the United States for a flourishing airline network as well as a high-flying public owning its own planes. Neither need suffer at the hands of the other, but tension between them will grow until enough airports are built to accommodate both and a workable arrangement for use of the airways safely and conveniently is brought about by the Government. END



FLYING

"Don't say anything. Sometimes Edward forgets and thinks he's back loading bombs again."

My Float Base Cost only $116

"From June to September, Lake Tahoe is one of the most popular of all California resorts. Flying floatplanes, from a base that cost only $116, enables me to cash in on the rush season up here each summer. The gross is good, without tying up money in real estate or airport maintenance. And float flying has made my base the social center of the lake."

— Part of a letter from Wes Stetson, Emerald Bay Resort, Lake Tahoe, Cal.

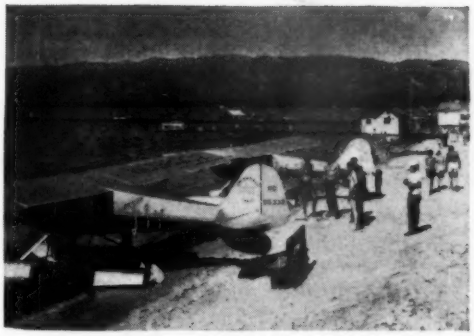
RESORT BASES ARE BONANZAS

Wes Stetson operates the highest float base in America — 6,275 feet above sea level. He moves in and out with the seasons, with all airport construction and maintenance handled by Nature. And floats put him right in the center of a crowd ready for fun and flying.

Any resort on or near water, and with a good annual volume of visitors, is ideal for float operations. Vacationists have leisure, money and a desire for sport. Flying forms a strong attraction for them, more so if from water. And resorts are a natural destination for transient flyers — to add more dollars to an operator's revenue from fuel and service. Resort managements are usually cooperative, for a float base brings in more visitors, gives them more choice for recreation and adds to the modern appearance and prestige of the place.

MANY SITES AVAILABLE

Resorts dot the map from Canada to the Gulf. Thousands are good spots for new floatplane bases. And it doesn't take much capital to start. Stetson spent only $116 for a base. A Lake Champlain operator used a strip of beach all season, spending exactly zero for ground facilities. If you want to operate floats seasonally, one or more planes and a few dollars for a base will put you in business. If you pick a year-round site you can start with a modest dock or ramp and build as you go. Your cash comes from such things as flight instruction, sight-seeing, charters, rentals, transients, storage, gas and oil and maintenance. Plus whatever side-lines you want to put in, such as water sports or fishing boats.



Potential customers find Wes Stetson's float planes convenient on this Lake Tahoe beach.

Day in and day out, float planes are the biggest attraction for visitors to this California resort.

HERE'S INFORMATION FOR YOU — You can get details on float bases — sites, construction, costs — by writing to Edo Aircraft. Free copies of "Air Harbors" and "Float Flying" and "The Flying Fish" will be sent to you at once.

Edo FLOATS FOR REAL FUN IN FLYING

EDO AIRCRAFT CORPORATION 110 Second Avenue
College Point, Long Island, New York

Flying Club Commandments

(*Continued from page* 31)

their side of the bargain to keep. They should fly only when and where authorized by the club. It has been proved many times that supervised flying courses cut hours off the time necessary to qualify for a license.

In almost every case there is apt to be one screwball. Beware of this ace, for he is likely to get your club into trouble or to interrupt flying activities by cracking up an airplane.

The first requisite of a successful flying club is a strong common interest in flying. Every member should share the ambition of wanting to learn to fly and to become a first-class pilot. Remember, the best lubrication for smooth operation is a deep sense of group responsibility for the preservation of all club-owned equipment.

A typical case of a member who does not measure up to these standards is the "aw, nuts" guy. Over-confident of his ability as a pilot, resenting the admonitions of the club director, he satisfies his own interests to the detriment of others. If a member of your club seems similar to the pilot in the following report, reduce the membership by one immediately!

"Student Flyer H. with 38 hours total flying time, planned to carry a passenger in violation of both Civil Aeronautics Board and club rules. To avoid detection, he took off from his base alone, after making arrangements to pick up a friend at an undesignated airport. The friend watched Flyer H. make six downwind passes at the field, overshooting each time. On his last attempt the engine failed to respond to the throttle. The airplane crashed into a fallen tree and suffered major damage.

"Subsequently, Flyer H. denied all responsibility. In his statement he made no mention of the previous arrangements with his friend and conveniently termed the accident the result of a forced landing!"

The actual organization of the club should be carried out with the advice of a lawyer or experienced businessman. It is important to have the club a financial success. You will need expert guidance as to whether a corporation might be more suitable for your club than an association or partnership. You should also have help in writing your constitution and by-laws.

Chances for success will be increased by drawing up an adequate operations manual, appointing a safety board and clearly designating flying time allotments. Pilots usually fly quite differently, even though they might have learned from the same instructor. By having recommended safe practices in writing for your particular-type airplane (operations manual) the plane will take less of a "beating" and student members will be saved indoctrination time. Placard the instrument panel for correct readings of all instruments; indicate recommended r.p.m. settings and place a complete check list in the cockpit.

Your safety board (president, operations manager and one or two other members) can serve by investigating accidents, penalizing members for violations of good flying practices. If club equipment is damaged through a member's disregard, the board would be wise to compel him to pay a greater proportion of the loss than the other members. If they feel a member is responsible for unsafe operation, they should expel him.

Allotment of flying time is important. College clubs schedule time quite successfully in advance. For instance the Smith College Flying Club posted the schedule a week in advance. Appointments could be broken if notice was given five hours in advance. The change was posted on the bulletin board and the airport was notified. Week-end flying was not scheduled —first come first served. Fines were imposed for tardiness either in starting or terminating a flight and for appointments broken without notice. The club also required a two-hour minimum of flying per week for each member.

Non-college clubs will find it harder to keep such a rigid schedule, for the member cannot be reached so easily. One group posts a board at the airport with a number of slats in ladder fashion. A member's name is put in each slat. The one at the top has the priority to fly first. If he is not there, the next one below him can have the plane. After a flight it is the member's responsibility to put his name at the bottom of the list. Flights are restricted to one hour's duration. If no one else shows up for the plane, the pilot can go out again. In general it is strongly recommended that definite rules for use of the plane be stated and appointments meticulously kept.

Another important concern is the club's financial status. Fixed cost (depreciation, hangar rent, insurance, financing cost) can be covered by monthly dues. The initiation fee will cover the original purchase cost. The flying costs (gasoline, oil, inspection, engine overhaul, aircraft overhaul, instructor's pay) can be figured on a "per hour" basis. It is advisable to collect from members in advance and to issue a card or book of tickets, or to have members pay the hourly rate immediately after each flight.

It has also been found that difficulties may arise when members take out insurance without fully understanding the terms of the policy. Policies should be studied carefully, noting particularly the clauses which vary according to the type of policy. It is extremely important to know just when the club is responsible and when your insurance company assumes liability.

Sectional aeronautical charts should be kept up to date. Members who notice special landmarks not already on the map which might help others flying in that area can start the practice of neatly adding the additional information. The presence of a chart of the local flying area in the airplane enables a member to refer to it from time to time so that he becomes accustomed to reading it easily.

Recommended good practice on the subject of maintenance is a big item. Although the modern airplane requires less maintenance than its predecessors, it is still vital that routine airplane and engine inspections be set up and checks be made by a certificated mechanic. (The new pilot is seldom qualified by either knowledge or inclination to do maintenance work.)

There should be a daily or line inspection prior to the first flight each day, an engine check every 25 hours, and a thorough check of both the airplane and the engine every 100 hours. The simple report form covering daily inspections that Aero Insurance Underwriters makes available to its assureds can be obtained upon request from any of its offices. Use the CAA Periodic Inspection Form ACA 319 for the 100-hour inspection. Both airplane and engine manufacturers supply handbooks giving proper maintenance procedures. Be guided by their recommendations.

Engines should be majored only by the factory or by a Government- and factory-approved repair station. The amount of flying time between major overhauls varies with different engines and operating conditions. However, 500 hours should be maximum unless the CAA or manufacturer recommends a longer pe-

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riod, and 400 is suggested if flying consists principally of landings and take-offs. The practice of making a top overhaul to stretch periods between major overhauls is not recommended, but often top overhaul of one or more cylinders may be required between majors.

Minor damage and wear should be handled on a continuous maintenance system. Small tears in the fabric, frayed shock cords, checked pyralin, etc., should be repaired immediately. Cleaning also comes within this category. An oily engine and cowl constitute a serious fire hazard. Oil-soaked fabric deteriorates rapidly. Dirty windows and windshields reduce visibility and endanger the occupants. An unkempt airplane commands no respect and is banged and battered about in consequence.

Airplane overhaul can be done with a variation of the same plan. For example, control cables can be replaced at one time, the tires at another, etc. If this work is started while the parts are still airworthy, it can be done during periods when the weather does not permit flight operations. If the work is postponed until the aircraft is no longer airworthy, serious interruption of flight schedules must be expected. An occasional inspection by a mechanic not connected with the organization that does the work is valuable.

Other important maintenance items include: (a) protecting pyralin from the sun, (b) protecting magnetos and ignition wiring from rain, (c) opening drain holes in the trailing edges and (d) keeping all snow and debris out of the tail of the fuselage.

Your manager will have the responsibility of supervising the maintenance of club equipment but this does not preclude the club members from investigating all the problems involved in the upkeep of their plane. The thoughtful participation of every member will help insure its success. END

"AND THERE I WAS..."

FLYING will pay $10 for every "And There I Was . . ." item which is accepted. Address: "And There I Was . . .", FLYING Magazine, 185 N. Wabash Ave., Chicago 1, Ill.

AS I was about to flare out for a landing on a small island in the Pacific off Central America, a sign flashed by my wing tip which read, "One-fourth." Farther down the strip was another sign which said, "One-half." Still farther, as I slowed down, another sign read, "Three-fourths." As I pulled to a stop at the end of the runway a final sign read: "THAT'S ALL BROTHER!" On the other side of that sign was a straight 200-foot drop into the Pacific.

—Capt. C. V. Glines, AC

OUR bombers were out on a big night raid against the munitions plant at Brindisi in northern Italy. After the raid, with the planes homeward bound, one of the fighter escorts was unlucky. He had part of his instruments shot away and got lost in the darkness. With almost all his gas gone he sent out a distress signal.

Over his radio came reassuring instructions. He was to land on a certain runway and the radio voice gave him detailed approach and landing instructions. It was light enough now for him to see the field—but there wasn't any field. He listened to the tower's instructions with growing apprehension, and finally yelled into his mike, "Where is this damned field?"

The radio operator replied, "Miami Beach, Fla., where do you think?"

"To hell with you," shouted the defeated pilot. "I'm in North Africa."

—Bennie Smith

AN ATC pilot returning from a special flight in the European Theater called the tower of his destination giving the routine information required of all incoming pilots.

"Eschborn Tower, this is Army 8851, E.A.T.S. Flight Number 719, departed Copenhagen a C-"Charlie"-47 with 3,684 passengers aboard. Give me landing instructions. Over."

Fed up with this sort of horseplay, the tower operator gave landing instructions and notified the airdrome officer to reprimand the pilot. The officer himself met the plane and flung open the door. To his amazement he found the pilot had not exaggerated his passenger list.

As he stepped inside, he was confronted with tiers of cages lining the inside of the plane—3,684 white mice, guinea pigs and rabbits, en route to Frankfurt for medical research.

—Reese S. Martin

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An electric starter and two-way, two-band radio are *standard equipment* on the Piper Cub Super Cruiser. To start the engine you just press a button on the instrument panel. And with the radio you can "fly the beam," talk with airport control towers, enjoy favorite programs in flight!

Although it brings you these many advantages, the Super Cruiser is a plane you can afford to buy and fly. See your Piper Cub Dealer now for a free flight demonstration, for the full-color literature and the popular books. . . *How to Fly a Piper Cub* and *What Your Town Needs for the Coming Air Age*. Remember—only Piper makes the Cub, that good, safe plane. Piper Aircraft Corporation, Lock Haven, Penna., U.S.A. . . . In Canada: Cub Aircraft Corporation, Ltd., Hamilton.

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FLYING

Beating the Stall

(*Continued from page* 39)

for each type of aircraft. After installation, the margin can no longer be adjusted. This is a safety factor against future maladjustment or tampering. Likewise, there is no provision for shutting off the instrument.

The horn-light unit is in a standard oil-temperature, gauge-sized case, convenient to install on a flight panel. Its light can be turned to either day or night position, the latter being a pinpoint to prevent blinding.

An additional reliability feature is that it can be checked by a flip of the finger against the wing vane during line inspection prior to take-off. On take-off it will operate for a moment just before flying speed is reached, and again on a three-point landing.

Stall-proofing, on the other hand, could be and has been imparted to airplanes by limiting fore-and-aft disposition of the load and the elevator travel. But stall-proofing imposes certain disadvantages in taking the danger out of accidental stalls. These include: higher landing speed, limited maneuverability, increased take-off run, increased problems in seaplane take-off performance, inability to stall for pilot training purposes, and inadaptability for fore-and-aft seating arrangements, necessary for planes of four or more places.

Stall-proofing is accomplished by limiting the controlability of the aircraft to a point which leaves a safe margin before the stall can occur.

Other things being equal, stall-proof airplanes must land at higher speeds because of the forward load disposition, lack of slipstream and the proximity of the ground influencing the airflow on the tail. In forced landings, a difference of 10 m.p.h. may easily be the difference between life and death to the pilot.

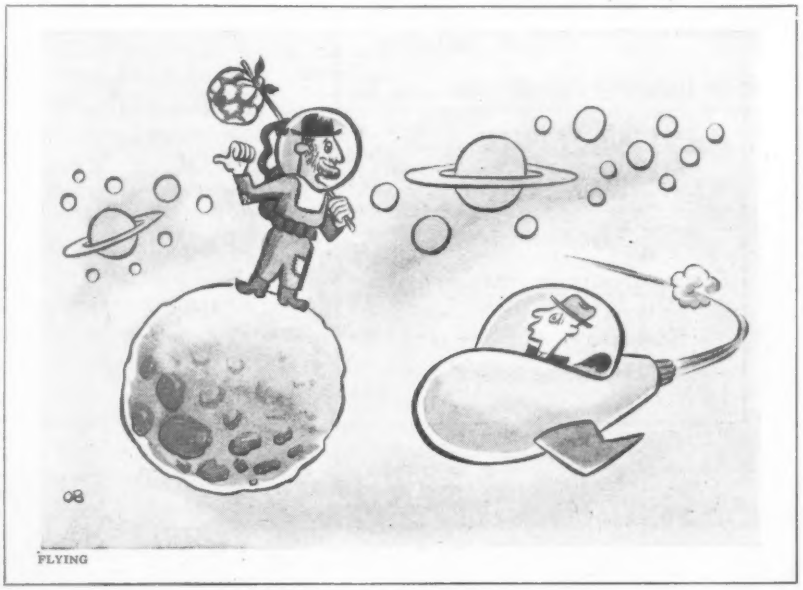
During my brief flight in Dr. Greene's Fairchild 24 we stalled in straight and level flight in left and right turns with flaps up and down in left and right slips and with power on and off. The stalls occurred over a wide range of indicated airspeed, but every time a stall approached a tiny red light glowed and the horn honked angrily. The indicator was never off guard. When we landed, Dr. Greene remarked:

"We've just completed more flight stalls than the average lightplane pilot experiences in a year."

Why so important? Last year 30 per cent of all fatal and severe injury accidents were caused by stalls. They have always been the largest single cause of aircraft fatalities and, if unchecked, will be so again this year. Hitherto pilots have relied upon the airspeed indicator to reveal the approach of a stall. But most normal flying occurs under varying conditions rather than in straight level flight. Thus the airspeed indicator can provide a false confidence which results in the pilot's death when other variables enter the picture, such as turns, weight and load variations, flaps, and power. And, too, under stress, as when fully occupied for a landing approach, the pilot can easily overlook the slight signs of an approaching stall. The stall warning indicator calls the attention of both ear and eye and thus quickly gives the pilot positive warning.

The indicator functions under all conditions but icing, a condition which should be avoided by any private pilot at all times anyway. That most private flyers do avoid icing, is indicated by the fact that only five of 512 stall accidents in 1941-43 involved icing and, in the past two years, no flyers have suffered from stall accidents involving icing.

Dr. Greene has turned his stall warning indicator over to the Safe Flight Company in New York City for sales and production. It will be sold under the name of Safe Flight Indicator. Aero Insurance Underwriters have flight-tested the Safe Flight Indicator and will grant a reduction in insurance premiums for aircraft on which it has been installed. END



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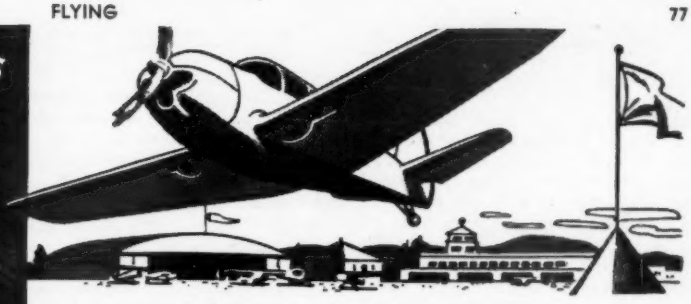
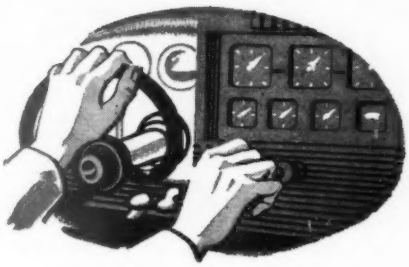


A page of service tips for private flyers and fixed base operators

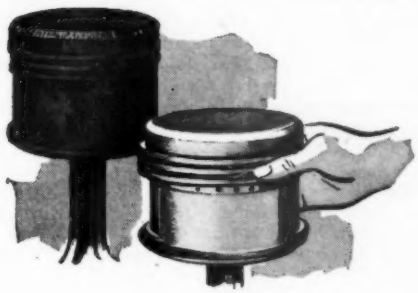
Improper idling greatest cause of forced landings



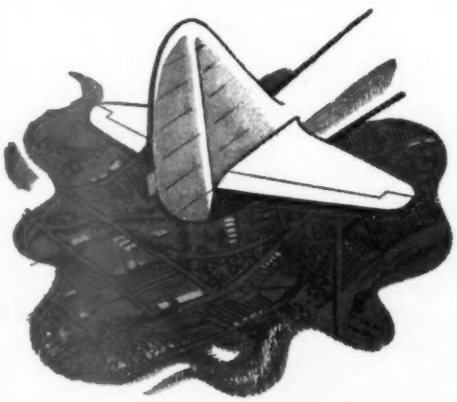
Throttle-stops set too low for proper idling are the greatest single cause of forced landings, according to the CAA. For maximum safety throttle-stops should be set for 500 rpm on the ground with the engine warm. With throttle closed, the idling mixture adjustment should be set for maximum rpm. The possibility of forced landings can be further reduced by using a fuel of proper volatility, such as Chevron Aviation Gasoline. Set throttles for best idling on Chevron. Then stick with it, for you can depend on Chevron for safe, sure power. Check periodically for wear on throttle stops.

Oxidation inhibitor doubles time between oil changes

Ordinary aviation engine oil is damaged by oxygen and heat. Just as a sponge absorbs water, some oils "absorb" air. This chemical change, called oxidation, causes sludge, making oil changes necessary every 25 hours. RPM Aviation Oil contains an oxidation inhibitor to reduce the formation of gum and sludge. That's why, when you fly on "RPM", you can double the interval between oil changes to 50 hours. Other compounds in RPM Aviation Oil reduce pitting and oxidation of bearings and valve guides, lengthen the life of airplane engines.



How to prevent stiff controls at high altitudes



In many instances, flyers find that aircraft controls stiffen at high altitudes. This is often due to the tendency of ordinary greases to become hard at low temperatures. Standard of California has specially compounded RPM Aviation Grease No. 1 to prevent it from stiffening in cold weather, yet stick to exposed parts at high speed. RPM Aviation Grease No. 1 stays put at all temperatures, gives smooth flight control in even sub-zero temperatures, seals dust out of bearings.

CHEVRON NATIONAL CREDIT CARDS AVAILABLE for private flyers, good at airports throughout the United States and Canada. If you reside in the West, write Standard of California, 225 Bush Street, Room 1618, San Francisco, California... or ask the Standard Airport Dealer at your field for an application blank.

One-Man Airport

(*Continued from page 53*)

to get my private until 1939. In 1940 I came back to Wisconsin and before long I had built up enough time for a commercial. In the spring of 1941 I took a pretty risky plunge. I sold my plane, all my personal belongings—everything I could get my hands on—and went up to Minneapolis to get my instrument rating from General Air Transport.

At that time I intended to get on the airlines but the European situation didn't look so good and I decided to take my hand at instructing. War was declared a couple of months later. I was flight commander at the field at Decatur, Ala., and then I was one of seven chosen to start the program to teach instructors at Maxwell Field.

Later I was transferred to the Air Transport Command, flew with Northwest at Billings and then trained with Braniff, flying mostly to the West Coast and Panama. Later on I ferried C-47s to Australia, and finally flew a C-47 across the Atlantic in July of 1944 and stayed in the ETO for about 15 months. A year of that time I was pilot for Adm. Alan G. Kirk, who was commanding admiral for most of France.

I'm giving you this background to show you that I do know aviation and that I'm not just a 100-hour pilot who is sitting on a little piece of ground up in the sticks because he'd be squeezed out any place else. I've got 3,800 hours now and recently refused chances to get on the airlines.

I was discharged from the service as a captain a little over a year ago and I've been up in Wisconsin ever since. I bought my Aeronca trainer last May. It had about 100 hours on it and has run like a sewing machine ever since.

Now I know you're asking, "How can one plane make you a living?" First of all, I want to assure you that it does but that I could make two planes pay me even better. There are less than 10,000 people in this whole county but after all, county lines mean nothing to an airplane and I can hunt business in neighboring counties.

My rates are low. I charge $8 an hour for dual and $6 an hour solo. I'm averaging about eight hours of instruction per week and rent the Aeronca out for several hours of solo time. In addition, I have lots of calls for cross-country trips. And I find that I can still pick up money barnstorming.

Now let's add it all up. My plane rentals gross maybe $80 per week. When you add in barnstorming I come out pretty well. In three days of a county fair I can take in $400 easily. As for cross-country, it seems to be building up all the time. That's the main reason I want the Piper *Super Cruiser*. I find so many times that both a man and his wife want to take a trip and I can fly only one of them in the Aeronca. We are 118 miles from Milwaukee—say 240 miles for the round trip. It takes three hours to drive one way by automobile and most farmers can't spare the time because they have to be home for their evening chores.

My *Champion* can fly down in less than an hour and a half and land at Maitland Field, which is right along the lakefront and only three blocks from the heart of downtown Milwaukee. I've got enough of that kind of business alone so that I've established a flat rate of $15 round trip. For the rest of my cross-country I charge a straight $6 an hour, which is plenty cheap.

I still find a good many people who have never been up in a plane before. And there are a good many others who want to see what the country looks like from the air. Farmers look at their fields to check erosion and to see how the crops are coming along, and to check drainage. Lumbermen like to check timber from the air. And a good many sightseers like to see what the country looks like. There's the nearby Necedah National Wild Life Refuge where you can sometimes see hundreds of deer during a single flight. The Wisconsin Dells are nearby, too, and people like to fly over them.

My instruction business is building up also. I've got classes started in nearby Coloma and Wautoma and intend to have them in Necedah and maybe other towns. It won't be long before all my afternoons will be taken in other communities. I fly in and out of farmers' fields in close to these towns.

I don't expect my business to slacken off in winter except for the trouble caused by weather itself. I have skis and there's plenty of snow up here. Most of these towns have little lakes right up near the business districts and it will be even more convenient to land on them than on the fields I use in summer.

But of course the main reason I come out so well on this deal is that I have almost no overhead. I lease my airport for only $40 per year. The county itself helped me put in my 1,800-foot N-S runway. My 2,000-foot E-W runway didn't even need to be levelled. The runways, of course, are turf-covered, and in this sandy country you don't have to worry about drainage—the surface is always hard—the wetter it is, the harder. In fact, the county is even thinking of taking over the airport and improving it still more, giving me a lease.

As I mentioned earlier, I built my own hangar. The picture you see on page 52 shows it before it was completed. I purposely left the east end open because I had expected to enlarge it for that *Super Cruiser* I want to buy. But now I've closed it in for the winter.

Even so, it's the simplest kind of a structure. I don't have any floor except in my office, which is insulated and heated. The plane sits on bare ground, winter or summer.

What do I do for mechanics? I fly it down to Portage Airport, about 40 miles away, or I can even take it into Chicago for major work. I do the line checks myself, pump the gas, and so forth.

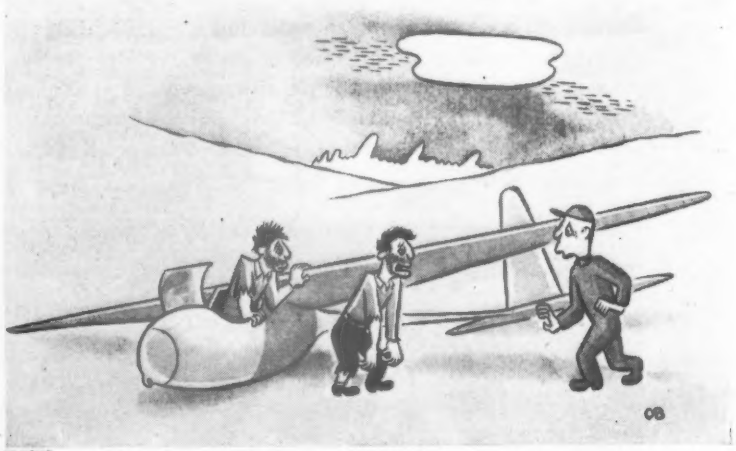
My personal living expenses are low. It's much cheaper to live here than it could possibly be in the city. All in all, I come out well enough in the deal so that I am part-owner of a new motion picture theater being built in nearby Adams.

Now to get somewhat more serious, I believe that my type of airport is important for the country as well as for me. Of course it's a minimum operation but it's the only kind of operation that can reach millions of people. There are 3,052 counties in these United States and there must be hundreds of them without a single airport. They can't support fancy big hangars and paved runways and line boys running around to polish windshields. But they can support an operation like mine which starts out as a half-time venture and grows along with aviation.

Then there's another very important advantage to my kind of an airport. You can start it on a shoestring if you're otherwise qualified. I've paid for both my hangar and plane as I went along.

And personally, there are two other advantages which are perhaps the most important of all to me. First, this is the country where I want to make my permanent home. Second, I like very much being my own boss.

Disadvantages? Not very many. Why, they tell me I may even have electricity before long. END



FLYING

"We were stranded three days on an updraft!"

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AERONCA CHAMPION

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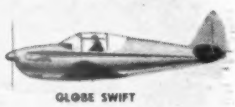
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How to Fly a Helicopter

(*Continued from page 48*)

upward flight, ease off on the pitch lever until the lift of the main rotor is balanced by the weight of the 'copter. Now we are suspended motionless with all controls equalized.

To move the 'copter to the right while maintaining our point of direction, simply move the cyclic control stick to the right and compensate for the loss lift with the pitch control stick. If you had eased off on the left rudder during this maneuver you would have accomplished a banked turn to the right. By much the same process we may achieve either forward or backward flight. With the cyclic control stick forward, we fly forward; with the stick back we fly backward. Suppose we try a bit of forward flight.

You will note the nose-down attitude of the 'copter fuselage—in fact our main rotor is pulling the suspended fuselage through the air. By increasing pitch and tilt of the main rotor we can achieve up to 100 m.p.h. in this manner.

Time's about up for this first lesson. Suppose we try an auto-rotation glide and a flare-off before we land. You will need to know these maneuvers if your engine ever fails or you want to use the flare-off for a quick stop in mid-air.

From forward flight we go into a glide simply by decreasing pitch of the main rotor blades. The lowering of the pitch lever automatically cuts the throttle and the automatic clutch disengages, letting rotors "free-wheel" in the air stream. Don't let the fact that the ground is rushing up at a pretty fast clip worry you. All we need is to come back on the cyclic control stick and the main rotor acts as an umbrella brake. This is the flare-off. If the engine actually had ceased to operate you could mush down to a remarkably easy landing by increasing main rotor pitch and balancing the other controls. But since the engine is operating, the increased pitch and the balancing of other controls suspends us again in mid-air. Ease off on the pitch control stick slowly and we settle down to a four-point landing, light as a feather.

There is plenty more to learn but this is enough to give you a general idea of how the most amazing flight innovation of our times does its stuff. And it will be an even simpler mechanism to operate by the time it is available to Mr. Average Citizen. END

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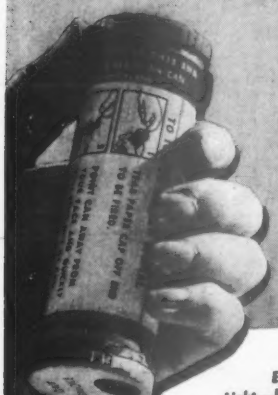

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So We Bought a Glider

(Continued from page 55)

biggest crate arrived on a rainy day; the trucker had broken his wagon and been arrested for obstructing the highway. "Get this damned thing off my truck," he roared. Came then the local police, protesting that traffic was detoured for miles around. Came also every small boy in the neighborhood, each apparently anxious to fall off a glider crate and break his neck. The rain poured down, the truckman swore, the ropes broke. We finally borrowed a railroad jack with a lifting capacity of 15 tons. The crate was raised upright from the truck where it teetered uncertainly and fell over on its face with a crash that could be heard a mile away.

This had happened, in lesser degree, with four other crates before. By now the house could not be seen from the roadside, but a large glider was taking shape on the lawn. And the lumber was piling up.

In these times, any building contractor would pay through the nose for 7,000 feet of lumber and like it, we reasoned. But this lumber was fastened together around a cargo glider with 400 bolts and at least a million nails. Fortunately, small boys like to smash things. Dozens of them were issued hammers, wrecking bars and floor chisels, and told to go to it. They took the crates apart, mainly to find out what was inside, and were paid off with ice cream cones and soda pop. Slave labor? Well maybe the Pennsylvania Child Labor Laws would like to make something of it.

The veterans also labored on the crates, and in their spare time put the glider together. According to the T.O. book thoughtfully supplied with every CG-4A, 12 men can assemble a cargo glider for active service. It took only three to assemble this one. When the job was done, our new lawn fixture had a 48½-foot fuselage and 85-foot wings, with one tip on the apple tree and the other among the petunias. And every kid within miles playing with the controls, or jumping through the escape hatches and shouting "Geronimo."

So what? We had that lumber. It included 4x6 timbers, 24 feet long; 16-foot white pine boards, 12 inches wide, and a lot of shorter ones. There was oak, spruce, yellow pine and fir—piles of rough flooring, shiplap sheathing, studs, joists and firewood. Owning a surplus glider was like living next door to a lumber yard on a dark night. Whatever we wanted for a building job, we went to the glider and got.

They packed these craft for overseas service, for throwing into ships and dumping onto docks. They used the best and plenty of it. Too much and too good, maybe—crating with white pine boards worth 20 cents a board foot or more. That's the way those things were done in wartime.

Mind you, I'm not complaining. The glider crates have supplied every stick of wood needed to add to the house a new dining room, large bedroom, porch and balcony, with exception of the finished flooring. Even the door and window trim was ripped out of the white pine boards; for moulding we used the bracing strips from the glider's fuselage. The fabric, worth $1.25 per yard when Commonwealth built the glider in Kansas City, served nicely for insulating paper beneath the outside plaster. That sort of stuff is hard to get. Kraft paper from the crates went between the rough and finished floors. Lighting fixtures for the new addition, which we now call the "Glider Wing," will be fashioned of plexiglas from the control cabin. Some slightly second-hand parachutes, salvaged by the ex-sergeant in Assam, India, are now curtains for the bedroom, strung on cables salvaged from the glider.

Trouble is that there's a great deal of the glider left. A dead whale would be more desirable, because a whale will eventually disappear from change and decay. The obvious solution at first was to salvage everything salable from the glider. There should be a great deal, we thought, because the thing cost $22,500 in the first place and was nearly as good as new.

But so far, the balance sheet in this respect is not encouraging. I have sold the instrument panel complete for $50; the telephone mike and headsets for another $10. Four seats from the ship have brought $2 each. A neighbor bought 20 feet of cable and two ball-bearing pulleys to make a measuring gauge for his well; another took 10 square feet of mahogany plywood from the wings to make model airplanes. I have sold a dozen eight-inch bolts for 20 cents; and I still have exactly 388 for

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sale, in quite a variety of useful sizes.

They tell me the remaining stuff is valuable. The wheels and tires—eight-ply Firestones—are worth a lot of money. Visitors admire the wheels and kick the tires, but show no disposition to bid or buy. Safety belts are worth $6 each, but no one who thinks so offers it. There are 25 pounds of lead, more or less, somewhere inside the ailerons, and scrap lead is worth 17 cents per pound. My problem now is to get someone to come and get the stuff.

It goes that way from one end of the glider to the other, and thereby hangs the moral of this tale. Now and then the American people (some of them) get hysterical because some Governmental scoundrel is selling war surplus for next to nothing. It's an outrage, shouts the indignant citizen, to sell $22,500 worth of glider for $75, including the lumber it is wrapped in.

Sparing the details, I have calculated carefully the predictable value of this remarkable machine as junk or salvage, plus the worth of the lumber at a time when anything like building wood, even second-hand, will bring 10 cents a board foot. The whole business works out to three cents on the dollar of original cost. To salvage that much I have pulled nails by the millions and I have cluttered my lawn forever with two tons of steel tubing and scrap plywood. My final conclusion is that a surplus glider, good as new, is worth $75 plus shipping costs and no more. Someone guessed it very close. I'm ready to bet that the same goes for s u r p l u s battleships, blimps, electronic equipment and surveyor's stakes, only more so.

Anyway, the veterans have their housing. Its flat roof leaked a little at the seams in autumn's first rain storm. We remedied the defect by reinforcing the roof, using linoleum cement, with sections of fabric from the glider fuselage. We'll be using parts of that glider for the next 10 years.

It won't surprise me if some day an airplane goes by and the pilot reaches hastily for his radio and calls CAA. His report should run:

"North of Philadelphia, about 16 miles, aircraft damaged or in distress. Identity of craft uncertain, but shows AAF emblem, serial number 514658. It's equipped with side porch, dormer windows and two chimneys." END

FRONT YARD AIRPORT

PHILADELPHIA lightplane pilots now have an airport 4½ miles from the center of the city. Released by the Navy, the Central Airport boasts surfaced runways and a clubhouse for visiting pilots. Other services available include "drive-yourself" automobiles, hotel reservation desk, 24-hour restaurant, complete servicing facilities, lighted runways for night flying, and hangar space for even the largest executive-type aircraft. A radio range tower stands on one of the field's boundaries.

The field is operated by Edward J. Waltz, former AAF lieutenant colonel, and Nicholas S. Ludington, a former commander in the USN.

How to Avoid Saving Money

by DANNY KAYE

To avoid saving money, the first thing is to cut off all your pockets. (Or throw away your purse and keep your lipstick in your snood.) Thus you will have to carry your money in your hand. Which will insure that you—1. spend it, 2. lose it, 3. get it taken from you—*quicker!*

Also to be avoided like crazy are piggy banks and sugar bowls. Keep these out of your home! The kiddies in particular are victimized by such devices, often saving quite a bale of moolah. Be stern even if the little ones cry—remember what money could do for them! And be sure to avoid budgets. It is best to draw your pay and walk down Main Street buying anything you don't particularly hate.

Above all, don't buy any U. S. Savings Bonds —or it's *impossible* not to save money! These gilt-edged documents pay fat interest— 4 dollars for 3 after only 10 years! There is even an insidiously easy scheme called the Payroll Savings Plan by which you buy bonds *automatically*. Before you catch on, you have closets full of bonds. You may even find yourself embarrassed by a regular income! Get-gat-gittle!

Danny Kaye

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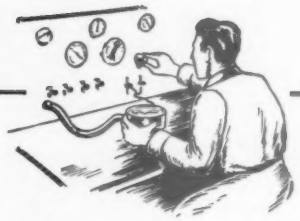

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Report from Washington

(*Continued from page* 51)

month, not in inflated Chinese currency but in U. S. cartwheels. And don't believe the stories you hear about all pilots who were in World War II swearing off dangerous flying for the rest of their lives. Plenty of our flyboys seem willing to do another stint most anywhere. We're told that Chennault is having to fight off applicants, they're so numerous. . . .

Oriental Airlines

Speaking of the East, we learn from CAA that commercial transport will be booming there before the end of 1947. There are still a lot of bugs in the Oriental flying program, and a lot of war wounds yet to be healed, but full-throttle progress is already on the planning boards and a leading role will be played by U. S. operators. According to William Robertson, assistant CAA administrator of foreign operations, recently returned from a tour of the East, CAA offices will soon be operating at Manila, Shanghai, Tokyo, Sydney, and probably Calcutta. Some of the offices are already going strong. CAA plans to spend $8,000,000 on radio ranges in the Philippines. The ranges will be U. S.-built and will be manned by Americans until natives can be trained. About 50 natives will be trained annually, replacing all U. S. operators, according to the plans, about 1950. But things are still pretty unsettled, even in Manila, where Robertson reports that vandalism is so bad that you have to take your telephones and typewriters home from the office if you don't want them stolen. . . . It's better in Australia, where regular routes are being flown on good schedules. The Aussies organize the way we do, and like to get advice from us. Between Sydney and Melbourne alone there are 10 schedules daily.

China Transport

Perhaps most air-minded of the Orientals are the Chinese, Robertson reports, and the U. S. goal is to see a network of Chinese airways set up under an organization similar to CAA, with regulations to match. Shanghai promises to be one of the air capitals of the world, assuming the government co-operates in the world airline program under the United Nations. Every indication is that this will be worked out satisfactorily, perhaps before the end of the year. . . . Indication of the interest in flying among Chinese was evident recently when a lightplane manufacturer (Taylorcraft) exhibited a plane in Shanghai. Before the exhibit had been open a day, three Chinese came in with bags of gold offering to buy the plane, and there was such general enthusiasm that the Taylorcraft representative came away estimating that he could sell a thousand planes as fast as he could deliver them, once governmental barriers were removed. . . . But the barriers are still much in evidence, even in the transport field. Although the situation has improved somewhat since Robertson returned, it's still bad. For instance, if you want to fly from Shanghai to Nanking, you have to apply for permission, which takes from one to three days to get, fill out forms, be photographed, go through endless red tape. Natives have more trouble than foreigners. Flight time for the trip: 55 minutes.

Simplification

Navy's new simplified plane designation system is, if you ask us, working like a charm. Here's the list of aircraft and their new designations:

Fighters	VF
Attack	VA
Patrol	VP
Observation	VO
Transports	VR
Utility	VU
Training	VT
Gliders	VG
Rotary Wing (helicopters)	H
Lighter than Air (blimps)	Z

In the case of the VP and VR classes, these planes are further classified for administrative purposes into four-engined landplane, four-engined seaplane, two-engined landplane and two-engined seaplane by adding the letters HL, HS, ML, and MS respectively.

Pilotless aircraft have the general designation K with the following letter indicating the craft's duties. It goes like this:

For attacking aircraft targets	KA
For attacking ship targets	KS
For attacking ground targets	KG
For use as target drones	KD

Sign of the Times

Bulletin board masterpiece-of-the-month for a fixed base operator goes to Art Currey, with offices at municipal airport, Galesburg, Ill. We landed there recently and the first thing that met our eye was an ad clipped from a local newspaper:

WINDOW WASHER
APPRENTICE UNDER 30

"Pay starts at 90c per hour, time and a half for overtime. Immediate raise for improvement after 30 days. You are under the supervision of expert men. Union men receive from $60 to $78 per week. You also receive summer vacation with pay. This trade is a good trade. It doesn't require years of training to become a professional. If you are alert, it will take you about three to six months to learn this trade."

To this had been added the handprinted legend: "The post-war boom in aviation is over. There are easier ways to commit suicide."

Firm Foundation

But whether the boom is over—and it remains to be seen if the present difficulties in aviation may not be written off as seasonal and as the inevitable readjustment to post-war times—the industry would seem to be on a firm financial foundation, reports to the contrary notwithstanding. According to the Aircraft Industries Association, current assets are more than twice current liabilities. As of mid-'46, assets totalled $975,000,000, liabilities $420,000,000. The picture on net working capital was even better, totalling $555,000,000, as contrasted with $58,000,000 in 1939. The figures are based on fiscal reports from 21 aircraft and aircraft equipment companies, and were assem-

bled by AIA from statistics gathered by the Securities and Exchange Commission.

Grass

One of the little-noted developments that went on in Germany during the war was the use of grass on airports. The Nazis were short of many things before the big show was over, and had to be sparing from the beginning in the use of hard-surfaced runways. They employed grass runways as much as possible and were quite successful. Apparently they were more successful than we because they picked the mixtures more carefully and made sure that the ground in which the grass was planted had excellent drainage. They also took more pains with fertilizers and mowing techniques. Notable among the fields where grass is still used successfully is one at Bremerhaven, Fritzlar airport near Kassel, Furth airport, Illesheim near Nuremburg, and a field near Munich. Favorite mixture consists of 60 per cent Kentucky blue grass, 20 per cent white clover, 10 per cent orchard grass.

GCA

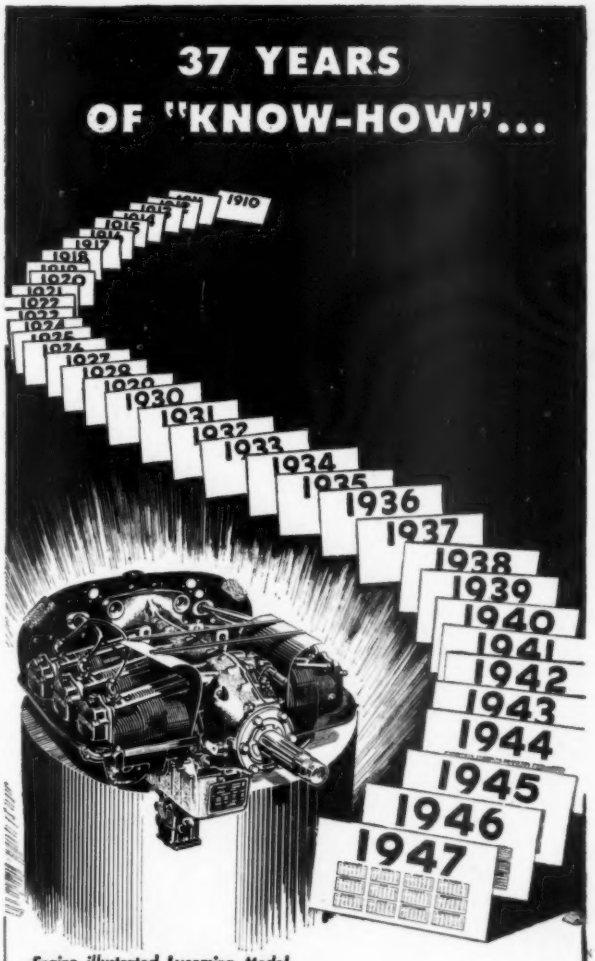
Like we predicted about a year ago (adv.), GCA (Ground Controlled Approach) is busting out all over as a result of popular demand and despite early opposition to the system by CAA. Latest boost to its application at U. S. airports is a new 500-pound GCA unit, about the size of a midget piano, which can be flown from one field to another in an emergency and operated by one or two men, as desired. First installed at LaGuardia early this year, it will soon be operating at scores of other fields, notably Washington (D. C.) National and Chicago Municipal. It costs only $100,000, as contrasted with the SCS-51 unit cost of $75,000 plus about another $100,000 for outer markers, plus heavy maintenance costs. . . . Nor is GCA limited to home duty only in the post-war world. Fifty operators are working in Japan these days, and scores of others at scattered points in the Pacific. All are sending in reports of GCA usefulness at widespread airports. Perhaps the prize comes from Tokyo. Not long ago, a GCA unit talked an Army plane in—and out stepped General Eisenhower. As everybody knows by now, Luis Alvarez won the 1946 Collier Trophy for developing the landing system.

Tickets, Please

Having been boondoggled out of a year's patience from time to time by the way airlines handle tickets, we looked into the subject in some detail recently and came to a firm conclusion. It is this: we feel mighty sorry for the airlines and their ticket problem, and from here on in will regard their mistakes with profound tolerance. With a triumph bordering on the diabolical, we discovered among other things that the new ticket introduced a few months back by American Airlines is about 50 years old. But when we took this up with perhaps the world's greatest expert on tickets, Clyde Freed, passenger ticket agent at Washington (D. C.) Union Station, he said the American Airlines model was a good one. He also added that if the airlines devised a better one, he would be the first to congratulate them. Could be the problem isn't tickets at all, but personnel. Railroad ticketers get $245 a month and are trained for a year before getting key jobs. Even at the depths of the war, their training lasted a month. Most airline ticketers are trained two weeks, get $155 a month. . . .

Air Cops

Long subject of futuristic jokes, air police are becoming a reality as the result of a CAA-state program now going into full swing. It began experimentally last year with a training course for ground policemen in Pennsylvania. Police with commercial licenses were first given a four-day course by James V. Bernardo of the CAA and H. G. Myers of the Civil Aeronautics Board. Then 500 cops got an intensive one-day course from the Federal officials, which was followed up by more detailed indoctrination from the afore-mentioned five-man state pilot faculty. The CAA's manual on aviation law enforcement was used as a text. The course informs the officers the limits of CAA's authority, the authority vested in state and local enforcement groups, how to investigate an accident and make an accident report, and general information on Civil Air Regulations . . . Pennsylvania reports good results from the courses, and others are scheduled for additional states this year. END



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The Bonanza

(*Continued from page 37*)

to Wichita to fly the improved *Bonanza*. Most of the changes in the new plane were designed for minor performance improvement.

When I flew the experimental model it had 45° of flap, which gave it a landing speed of 46 m.p.h. Later, Beech engineers found they had to cut that flap movement down to 20° in order to comply with CAA elevator trim and pitch moment requirements. Thus, the production *Bonanza* has a shallower glide angle than the experimental airplane, and lands at 55 m.p.h. instead of 46. Other changes, although they came about as the result of a tragic fatal accident, were minor.

That accident, incidentally, stirred up a lot of rumors about the *Bonanza* design, nearly all of them untrue. What actually happened was this:

Harry Reiter, engineering test pilot, and Robert King, engineering observer, were dive-testing a *Bonanza* at terminal velocity. The true air speed was 287 m.p.h. when one of the landing-gear doors was suddenly sucked loose in such a way that it bent downward, forming a scoop. In lightning-like succession that door scooped the violent slipstream into the landing-gear well and into the wing structure through the cut-out holes in the ribs. The extreme stresses and violent change in pressure caused the wing practically to explode. The rest of the airplane broke up in rapid succession. Though Reiter was killed instantly, King was thrown out of the plane and parachuted to safety to give an eye-witness report of what happened.

The landing gear doors and their locks were strengthened, and those wing-rib cut-out holes that face the wheel wells were filled in. The official never-exceed speed is 202 m.p.h. It is interesting to note that, despite the extreme speed of that ill-fated dive, no major fitting was found to have broken; all control hinges, spar bolts—even the engine—went through the violent mid-air break-up without failing. Had the landing gear door not failed, there is every reason to believe the airplane would have survived the dive.

BEECH BONANZA

Approved Type Certificate No. 777

Engine	185-h.p. Continental
Wing span	32 ft. 10 in.
Length	25 ft. 2 in.
Height	6 ft. 6½ in.
Gross weight (normal category)	2,550 pounds
Gross weight (utility category)	2,100 pounds
Empty weight	1,490 pounds
Fuel capacity	40 gallons
Wing loading	14.3 lbs./sq. ft.
Service ceiling	18,000 feet
Maximum speed (sea level)	184 m.p.h.
Cruising speed (10,000 feet @ 115 h.p.)	175 m.p.h.
Rate of climb (sea level)	950 f.p.m.
Stalling speed (with flaps)	55 m.p.h.
Normal range	700 miles

Source: Beech Aircraft Corporation

Most spectacular thing about the *Bonanza* is its performance. I have made good cruising ground speeds of as much as 170 m.p.h. at altitudes below 10,000 feet (at which the specifications say it will cruise at 175 m.p.h. on 115 h.p.). For this article I flew a *Bonanza* over a 108-mile triangular course at 5,100 feet at an average ground speed of 158 m.p.h.—despite the fact that there was a 39-m.p.h. wind blowing in such a direction that it served as a tail wind for only eight minutes out of the flight's 41 minutes. The airplane's gross weight at the time was 2,510 pounds (40 pounds under maximum). Cruising horsepower (2,050 r.p.m. and 23 inches) was used. On the preceding day I had flown the same airplane from Kansas City to Wichita (about 185 miles) in exactly one hour, with a slight cross-tail wind. The Beech test pilot who flew the first certificated *Bonanza* to the National Aircraft Show at Cleveland, where it was on display, filed a report stating that he flew 1,769 miles on the round trip in 10 hrs. 59 min., for an average ground speed of 162 m.p.h. Almost all of this flight was made at altitudes of 3,000 feet or less.

In other respects the *Bonanza's* performance also is spectacular. I have made several climbs from take-off (10 seconds from a standing start) at or slightly better than 1,000 f.p.m. (Beech officially claims 950 f.p.m.). In the airplane carrying that 2,510-pound gross load I took off into a 20-m.p.h. wind, using full throttle (185 h.p. at 2,300 r.p.m. and about 27 inches of mercury), but reduced that power the instant the wheels left the runway to normal cruising horsepower (115 h.p., 2,050 r.p.m., 23 inches). Yet, despite that fact, I was able to climb 2,000 feet directly from take-off at an average rate of about 750 f.p.m., a remarkable performance as present-day personal planes go.

While the *Bonanza* normally has been referred to as having a 165-h.p. Continental engine, the pilot actually has access to 185 h.p. The engine is a new design and was one reason for the delay in *Bonanza* production. A serious vibration problem was recently solved by the addition of a dynamic balancer on the crankshaft. The present engine has stood up well in tests, burning about 10 gallons of fuel per hour at cruising.

In flight, the *Bonanza* is extremely maneuverable and easy to fly. It is so sensitive on the controls that the average private pilot would have to fly it for some time until he became accustomed to the very slight control movements necessary to maneuver. The amount of pressure and movement normally used in turning a lightplane control wheel, for example, would probably turn a *Bonanza* through a complete roll. Elevator and rudder pressures are equally as delicate. In level cruising flight you do not have to keep your feet on the rudder pedals at all. I have even landed the *Bonanza* without having my feet on the pedals.

The slightest movement of the elevator gives immediate response. To climb or descend while cruising takes only the smallest movement of the elevator trim tab wheel just under the dashboard on the pilot's side. Over-controlling was one of my major problems in flying the *Bonanza*.

Though it looks it, the "butterfly" tail is not at all radical or unusual. No pilot, no matter how much experience he had, could tell there was anything unusual about the *Bonanza* tail just by flying the airplane. Only unusual things about the tail are its appearance and the fact that it is somewhat lighter, and that both sides of the V are interchangeable.

Both the rudder and elevator controls are attached to this one set of control surfaces. To climb, the pilot simply pulls the wheel back and both surfaces move

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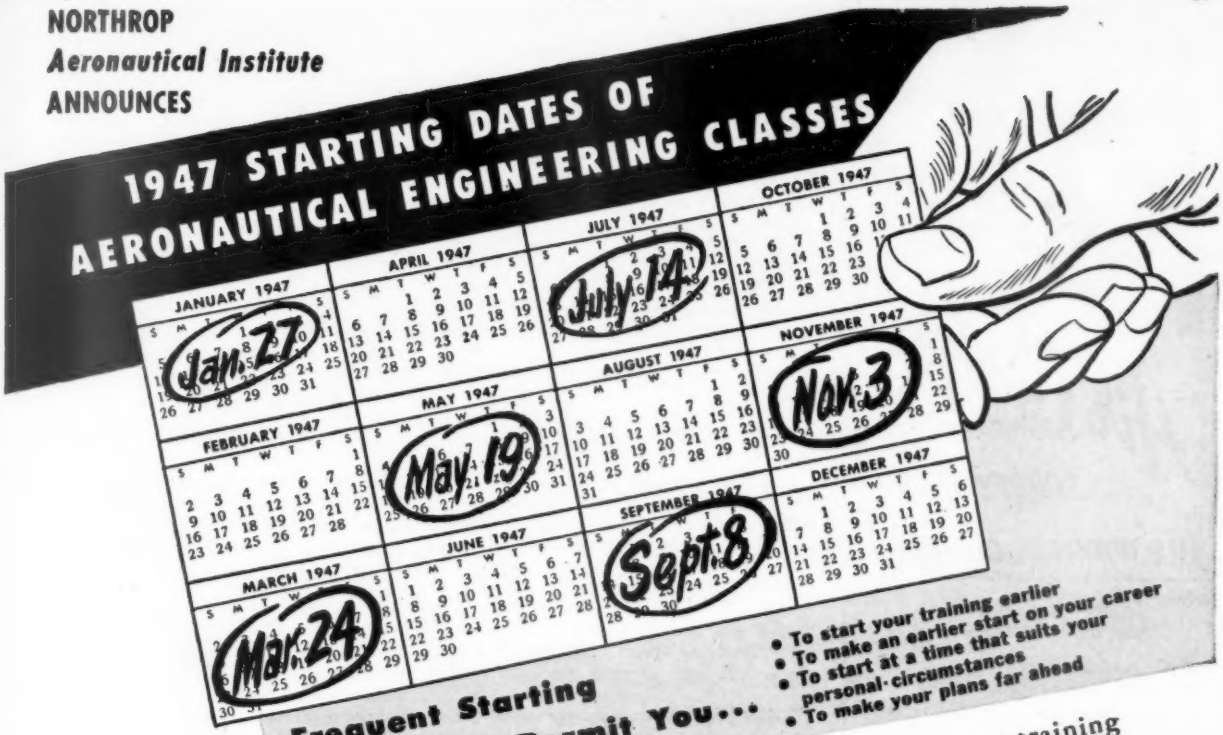

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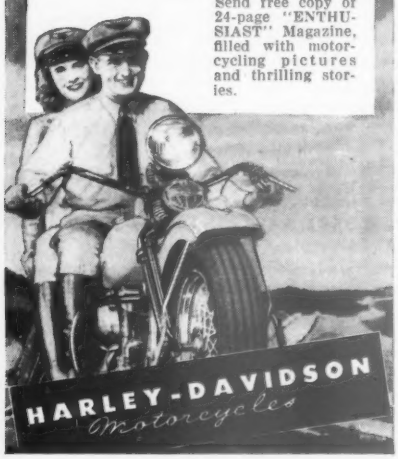

up an equal amount. To make a climbing turn, the pilot pulls the wheel back, turns it to operate the ailerons, then presses one rudder pedal. Moving that pedal causes the tail surface on the corresponding side to move upward an additional amount.

If any one flight characteristic of the *Bonanza* could be criticized, it is its stall. The *Bonanza* stalls with very little warning, except that the nose must be held so high that its position itself should warn even a dub—although this definitely is not an airplane that a novice pilot can jump into and fly away. Beech engineers worried about this stall characteristic for some time, then devised a new stall-warning device that will be standard equipment on production airplanes. The indicator is a flashing red light directly in front of the pilot on the instrument panel.

The *Bonanza* stall is not dangerous in the sense that the airplane unexpectedly rolls over into a spin before the pilot knows what has happened. Short stall strips on the leading edge of the wing prevent that. But when the *Bonanza* is stalled it pitches straight forward into a nose-down position, and then quickly picks up flying speed. Although the airplane will spin, it must be spun deliberately by the pilot.

Under no circumstances should this discussion give the impression that the *Bonanza* is a dangerous airplane. It is just the opposite. I would say it is a good deal safer in the hands of a careless pilot than are some other present-day personal planes. Even an amateur pilot would need to stall a *Bonanza* only a few times to realize that nothing short of wild-eyed stupidity would deliberately cause him to stall the airplane close to the ground.

A good deal more dangerous than a stall would be an inadvertent dive. This might happen if a pilot tried to fly through a thunderstorm and suddenly found that his airplane had been thrown over on its back in the turbulent air. Once it gets its nose down, the *Bonanza* builds up speed very rapidly. A careless, inexperienced pilot might get into a dive of 250 or even 300 m.p.h., then try to pull the airplane out sharply once he found out what was wrong. It was that possibility that prompted the high-speed dive tests mentioned earlier. Beech officials still plan to make sure that the airplane will take a dive of 300 m.p.h. without showing any signs of structural failure.

This might give the impression that the *Bonanza* is nothing more than a streak of greased lightning, with everything else gone by the boards. Far from it. With flaps and gear down and power off, I have stalled it at 55 m.p.h.; with flaps and gear up, it stalled at 65. It is so easy to land that it will take the conceit out of any self-styled hot pilot. I have landed the *Bonanza* at 55 m.p.h. and have braked to a full stop 250 feet from where the wheels first touched. It is landed, like any tricycle-geared airplane, on the back wheels first. When the nose wheel settles to the ground, it is taxied almost like you'd drive a car. If the nose wheel were steerable through the control wheel *Ercoupe*-fashion, it would be as close to an auto on the ground as you could find. The gear itself is extremely rugged. All three wheels are large enough to permit rough-field operations. One *Bonanza* landing gear in a testing laboratory made 1,000 simulated landings, each at a descent rate of 1,500 f.p.m. The same landing gear made a total of 100,000 simulated landings of all velocities without any evidence of failure.

But the *Bonanza* is so easy to handle on the ground that overconfidence will probably be its worst enemy, just as it has been with the *Ercoupe*. It's fun to taxi at 50 or 60 m.p.h. on a smooth runway, then swing gayly around past parked airplanes and slide into a parking space with full brakes. But you only have to have a brake failure, or misjudge the span of your wings . . .

If you want to fly slowly, the *Bonanza* will do that too. I was able to maintain altitude in that fully-loaded airplane by using 1,700 r.p.m. and an indicated air speed of between 65 and 70 m.p.h. Beech engineers say the *Bonanza* will maintain altitude with a full load on just 55 h.p.

The *Bonanza* has such high performance for its horsepower that it should be a very economical airplane to operate. The Beech sales department worked out figures to show that a *Bonanza*, flown by its owner, would cost just over two cents per passenger mile (assuming four people always in the airplane) if flown a minimum of 200 hours a year. That estimate includes the cost of operating, maintaining, depreciating and insuring the airplane.

When it comes to eye-appeal, the *Bonanza* is something to behold. The entire dashboard—instruments and all—was especially laid out for the airplane. The same two-tone color scheme is carried throughout, even on the faces of the instruments and on the radio. The seats are as comfortable as those in a good automobile, and almost as wide. The whole cabin is the size of a medium-sized five-passenger coupe. There is plenty of leg room for all passengers. In flight, the cabin is thoroughly sealed; the noise level is so low that all four people on a cross-country flight could listen to a symphony through the excellent radio loud speaker in the roof. The baggage compartment is large (14 cu. ft.) and is behind the cabin. It has its own locking door in the side of the fuselage.

While the arrangement of instruments and operating switches for the pilot has been thoughtfully laid out, they only minimize the headache the new pilot faces when he flies this airplane for the first few hours. So far as a lightplane pilot is concerned, the *Bonanza* is as complicated as a DC-3. There is so much cockpit procedure—prop setting, fuel tank selectors, cowl flaps, tab positions, retractable gear, flaps—that a pilot accustomed to flying light airplanes literally needs a co-pilot to help with the knobs and buttons.

No matter how much time I spent with the *Bonanza*, I could find no single "secret" to this airplane's success. It is simply the result of about two years of exhaustive design and engineering. Many little things have made the *Bonanza* such an excellent airplane. Milady will like it instinctively because the cabin is attrac-

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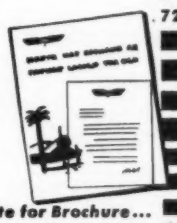

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tive and thoughtfully laid-out; because there is a small retractable step just behind the wing that she can reach easily, and because she also can step right onto the reinforced flap, up on the center section, then through an automobile type door, all without straining a garter.

"Little" accomplishments by the engineers boosted the *Bonanza's* performance considerably. Retracting that one step, for example, added three m.p.h. Adding the cowl flap gave six m.p.h., the special smooth windshield added three, the "butterfly" tail was worth five, the flush riveting seven, the completely-covered retractable landing gear, seven. Just a small closure in front of the flap added four m.p.h., and the internally-balanced ailerons were worth three m.p.h. In the early days of the design they experimented with (and later discarded) a laminar-flow wing, and even built an airplane with one. They also found that, to get maximum performance, they had to design their own special propeller blades.

Night flying should be easy with the *Bonanza*, which comes completely equipped for it. The instruments have luminous faces and there is an overhead red light with which the entire panel can be lighted if desired. Night landings are easy, although the *Bonanza's* two landing lights are so close to the propeller that its arc reflects a considerable amount of glare into the pilot's eyes—just when he needs his maximum vision most. Aside from that fact, this airplane has unusually good visibility, day or night, on the ground or in the air.

All ordinarily de luxe equipment is standard in the *Bonanza*. That includes a complete set of primary flight instruments, turn-and-bank, rate-of-climb and all. The Beech electrically controlled propeller also is included, as is the night-flying equipment, radio, and throw-over control wheel, and windshield defrosters. The radio deserves special mention. It is the new Motorola *Avigator* and it combines in one small package a receiver, transmitter, broadcast-band receiver, marker-beacon receiver, aural-null loop and automatic reeling antenna. It can be tuned manually or with a series of push buttons which can be set and reset quickly in the air. All this equipment incidentally is included in the *Bonanza's* empty weight.

First production models of the *Bonanza* will be all-metal except for the control surfaces, which are fabric-covered. However, metal control surfaces also are expected to be standard equipment shortly, further improving the airplane's already well-thought-out maintenance accessibility.

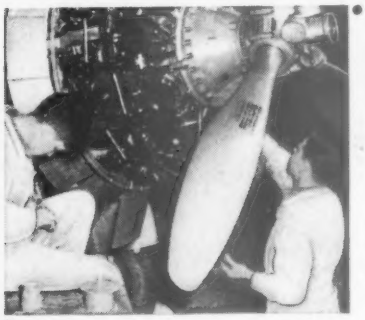
As this is written, three *Bonanzas* are being flown 16 hours a day, seven days a week in an exhaustive accelerated service test. Eighteen pilots fly the airplanes in shifts, their sole job being to do everything the average private owner would do and get 1,000 hours on each plane. Any design change indicated by a failure is made immediately, although the test airplane itself is quickly repaired and sent back into the air. The result, Beech officials hope, will be a "bug"-free airplane. No airplanes had yet been delivered, either to distributors or owners, although the company already has over $2,000,000 invested in the design. Engineers call this basic design "good for 10 years."

Contrary to rumors, the price still is $7,345. According to John P. Gaty, vice president and general manager of the company, "there will be no increase in that price unless, once we get into production, we find that the airplane costs us more to manufacture than we have estimated."

Altogether, I must admit frankly that the *Bonanza* is one of the best personal planes I've ever flown. It is immediately clear to anyone who spends any time with this airplane that it was designed and produced with the customer's desires very much in mind. Beech has obviously taken great pains to see to it that the perpetually-dissatisfied, always-griping private pilot gets just about everything he might want. There is plenty of utility, economical — and exceptional — performance, comfort and safety.

Which leaves the private pilot with just about two things still to be desired in this airplane: simplification and lower cost.

Simplification now would require expensive automatic mechanisms. Only large-scale production will bring the desired reduction in cost. —MAX KARANT



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Letters

(Continued from page 6)

same attitudes and glide path angle in both cases. Higher altitudes and temperatures increase only the true airspeed for a given indicated airspeed and hence make the landing groundspeed higher and the run longer. (Differences in load will have the same effect on safe glide speeds at altitude as they do at sea level.)

To glide with the nose down as the major suggests would tend to cause him to require an unusually long landing run due to the cumulative effects of the higher true airspeed for his indicated airspeed plus added indicated airspeed due to the nose-down glide.

JACK ANDRESEN
Elmhurst, N. Y.

● FLYING's editors referred Reader Andresen's comments to Major Madsen for a reply. He wrote:

"The drop rate on an airplane in a normal glide at high altitude will be greater than at sea level, although the indicated air speed may be the same in both cases. In other words, although the glide attitude will be the same, the glide path will be steeper at high altitude because of decreased lift of the wings due to the rarified atmosphere. And this is a condition with which pilots new to high altitude airport landings should bear in mind.

"It is recommended that pilots new to mountain flying glide with the nose down, even though an increased ground speed will result, to avoid the danger of an inadvertent stall. It is to be pointed out, too, that a stall will occur more rapidly with less warning at high altitude than is the case at sea level.

"I agree with Mr. Andresen that high altitudes and temperatures, for a given indicated airspeed, increase the true groundspeed and hence make the landing groundspeed higher; the all-important point is that in high altitude landings, a higher groundspeed is required than at sea level."

WILLIAM D. MADSEN
Major, CAP

FASTEN THAT SAFETY BELT!

Just want to comment on the picture on page 41 accompanying the article "Two Gals and a Plane" (November issue). I'm sure that Fred O. Perkins taught "Gypsy" that the first thing to do is to fasten the safety belt; but of course she and Fran are too smart to bother with trifles!

FRANK E. WALSH
Chicago, Ill.

THE NAVY TALKS BACK

After reading "Close Support—Army Style" ("Letters" column, October issue) by Charles F. Heil, we find the man bitter. The Army Air Forces earned a "well done" during the war and made an admirable record for itself. But why be bitter about sharing the air?

In answer to Mr. Heil's extremely rash statement of his prowess in bombing with a P-40N-5 with two 500-pound bombs or three 250-pound bombs and with particular reference to his statement, "We'll lick the pants off of your so-called Navy flyers," we'd like to offer a few facts for your consideration.

The Navy flyers generally believe that there may always be someone better somewhere and that one can never be too good nor make the statement that "we are the best of all" in any particular field of endeavor.

Our bombing squadron consistently gets plenty of hits in dive bombing, glide bombing, mast-head bombing and low-level bombing attacks that average below Mr. Heil's prime example of 13 yards.

We'd welcome a little friendly competition.

LIEUT. (JG) C. C. HILL, USN
LIEUT. (JG) R. S. HOSIER, USN
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Quonset Point, R. I.

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R. E. LIFE
Manager, Wood County Airport
Parkersburg, W. Va.

FIRST JET HELICOPTER?

In reading your "London Letter" (October issue) I came across the item "Who Did It First?" which stated that the Weir-9 claimed to be the first helicopter with jet control and the German Doblhoff also claimed priority.

Perhaps I can give some information. I don't know the name of the inventor but I do know he was an Austrian and lived in Zell-am-See, Austria.

He designed and built a jet-driven helicopter, the lifting rotor being jet-driven. The jets were on the end of the blades. A small fan-type prop was used to cool the engine. The blades could be folded and the helicopter driven along the road.

When I saw it (this was in June, 1945) he hadn't developed a cooling plant for his oil system and would not fly it for over a half hour at a time for fear of overheating. I talked with him and saw the helicopter flown by him over the field that we used regularly for track practice. (I was stationed in Zell-am-See for a couple of months with the 101st Airborne Division).

KENNETH D. MERCIER
Lowell, Mass.

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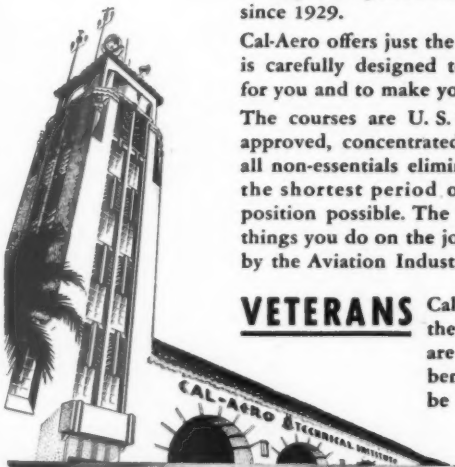

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Aviation's Super-Service Stations

(*Continued from page 42*)

the future complete control flow station).

4. AIRPORT INCOME. Possible revenue sources are analyzed. These include flight instruction, aircraft rental, fuel sales, hangar rental, aircraft service and repairs, charter service, sale of aircraft parts and equipment, and airlines landing fees. Restaurants and refreshments; car parking and servicing; parcel checking, taxi service, telephone, telegraph, and newsstand; rental space for other businesses, and crops from unused land—all these are included in estimating potential income.

5. DETAILS OF BUILDINGS. Suggested types of buildings are shown in the size and extent of proposed operations. General specifications (not working drawings) and perspectives are given for service hangar, administration building, airport sales station, and multiple unit hangars.

6. FINAL STAGE OF AIRPORT DEVELOPMENT. It is recommended that the airport development be planned for three to five stages, with the activity level governing. The final stage is conceived *at the beginning*, so that all facilities may be designed for (a) efficient and economic over-all operation, (b) emphasis on provision for necessary and profitable facilities, (c) orderly expansion. Such planning assures that no item need carry an operating cost inconsistent with the service it offers during the early stages of development. Here in the final stage is shown the completed airport, with lengthened runways, added taxi-strip, garage and freight station, and adequate parking facilities.

The step-by-step analysis is easy to follow, and its general procedures are applicable to any city or town.

Opinion is crystallized and action is motivated. A local airport committee is formed to handle the details, treating the enterprise like any other business. A lawyer, a real estate man, an engineer, a veteran flyer, and an outstanding businessman comprise the committee. Subcommittees are appointed by the chairman, and the project begins to roll.

Long explains the function of the CAA's Airports Service to the committees. He tells them how to communicate with the district airport engineer, who will give them assistance in the selection of a suitable site, advise them on construction details, and provide other expert help and co-operation.

The enthusiasm is electric, and you have the feeling that the group will be able to avoid many of the mistakes made by similar groups in the past. They will plan *all the way through* at this early stage, thanks to the sound guidance of the oil company representatives.

We take off early after lunch. Long wants to drop in on an aircraft serviceman at the Thomasville airport about 60 miles off our direct course to New York. The dealer is already in business, and has a complete stock of gasoline, oils, and aircraft lubricants. He has used "Airport Sales Station Type 10-A" plans, and other items furnished by the company. His white station trimmed in bright red has plenty of office and storage space, a garage, and clean restrooms. He is on the beam.

This one-day check-up serves to indicate the type of service the oil companies perform; for what has been said of Socony-Vacuum applies equally to Gulf, Pure Oil, Shell, and the several Standard Oil companies. The Texas Company alone leaves airport development service to the CAA, concentrating on business-management training of dealers and operators. But experience seems to indicate the wisdom of inaugurating a broader promotion program at the present time.

"We started an airport planning program more than a year ago," explains A. J. M. Hamon, who has charge of Shell's personal flying activities. "We found by checking with CAA representatives, that in a majority of cities no particular thought was being given to post-war airport planning.

"The CAA lists some 2,900 cities and towns that need airports," he continued. "From that list we selected more than 800 communities to help in airport planning. Already 250 cities and towns have made use of our planning service."

Much of the promotional program is educational and is slanted directly to potential customers. Shell, for instance, has produced and distributed a number of educational films on aeronautical science, and has distributed through dealers a great number of books and pamphlets on aviation.

Back in 1937, Maj. Al Williams, of Gulf, decided to wean the lightplane pilots away from the vicinity of local airports. He believed that private flyers should be encouraged to make more cross-country trips. Realizing that the annual Miami All-American Air Maneuvers would attract many lightplane pilots if they were given an incentive, he started the annual "Gulf Light Plane Tour." Gulf furnished gas and oil free to the 208 pilots who joined in the cavalcade. Experienced pilots were designated as wing leaders for the four "Gulf Airways," to insure safe navigation.

The idea gained popularity immediately. In December, 1938, 350 made the tour; and nearly twice that number in January, 1940, the last of the controlled flights. In January, 1941, the 1,440 pilots who made the trip were on their own. Many of them faced and mastered the problems of long cross-country flights for the first time. The flight tours were discontinued during the war, but were resumed in January 1946. Gulf's contribution of over a half-million gallons of gasoline for these tours helped to break the shackles of airport flying to a great extent.

The oil companies are doing a constructive job for aviation. They co-operate fully with the CAA, and explain the aid that can be obtained from the Government. They hammer on the necessity for making airports pay their way, as any other business should. They make the operators and dealers "cost conscious." This naturally takes some of the glamor out of operating an airport, but it also guarantees a longer life. And that's an important point to consider.

There are rough spots, naturally. Some of the companies are still evolving policies, particularly with respect to financial arrangements with dealers and airport operators. There are some cases of unwise procedure in the competition for exclusive rights and the promotion of new business. But also there are some individuals, as well as communities, who have the peculiar idea that they can get unlimited funds from the oil companies for construction of runways, buildings, and other facilities. On the whole, however, the outlook is good.

The oil companies did not build the highways, but by making us confident of

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our fuel and supplies, they helped us become a nation on wheels. Now they are helping to give us wings.

When a company like Texaco employs the famous Norman Bel Geddes to design an ultra-modern service station for airports that has *everything*—office, salesroom, garage, rest-rooms, pilots' chartroom, a teletype drop for weather, inter-communication with the control tower, plenty of parking space, and super cheerful "circle service," including pre-flight tests—things begin to look up. And now that 10 such stations are actually to be built on selected airports throughout the country, the prospects are definitely bright along "Aviation's Tobacco Road." The accent is on service—not sometime in the distant future, but now. END

Have We Been Too Optimistic?

(*Continued from page* 18)

flying. But in the last analysis the key man is the man in the cockpit of the personal plane. If he can cultivate good piloting habits and avoid reckless flying, private flying will be benefited immeasurably.

But the gains to be accomplished by self-discipline and regulation alone are relatively small. The fundamental solution to the problem is improvement of the three basic tools with which we must work: First, our radio aids to navigation, the Federal airways system; second, our system of airports; third, the design of civil airplanes.

In the first two fields, at least, the Federal Government has a heavy responsibility.

1. In the fields of radio aids to navigation we must complete the modernization of our airways system by the installation of the proven high frequency radio ranges and instrument landing systems as rapidly as possible. These devices will contribute a very substantial advance over the existing system, the basis of which was established some 15 years ago.

Simultaneously with the installation of proven devices we must extend every effort to adapt the nation's estimated two billion dollar investment in radar to use by civil aviation.

In war, calculated risks are acceptable and the great advance in bad weather flying which even imperfect wartime radar made possible could be gladly accepted without thought of cost or occasional unreliability. The task now before us is to adapt war radar to the somewhat different tasks of civil flying and to bring it to commercial standards of economy and reliability.

The contribution which radar can make to scheduled and non-scheduled air transport is obvious. Airborne forms for lightplane flying appear to be far off because of problems of weight, complexity and expense. But certain adaptations of ground radar such as the simplified GCA (Ground Control Approach) on which CAA and the Army are now working hold real promise for the private flyer. It will only supplement and not displace existing instrument landing systems at congested terminals but it points in the right direction.

We must also develop and evaluate other systems—Teleran, Navar, Lanac—to name a few which at best will not be ready for airline use for another five years.

2. In the field of airports we must implement our Federal airport plan as rapidly as our Federal budget permits.

3. In the special field of personal flying we must offer the same degree of assistance and incentive which we did in the early days of transport flying. This could take the form of special incentives for more rapid improvement of lightplane design. Or it could mean Government-approved basic research. The next two years will tell which method is best. In the meantime, the improvement of airports and air navigation aids will, of course, provide a further stimulus to private flying growth.

The technical aspects of this work have been reviewed elsewhere by T. P. Wright, CAA Administrator. I can only add that I believe we are still in the Model T stage of lightplane development and the sooner we go beyond it, the better for the public, the pilot, and the industry.

Last year we of the Department of Commerce and the Civil Aeronautics Administration stated that perhaps the greatest potential for long range expansion of civil aviation exists in the development of personal flying, but that the combined efforts of Government and the industry would be necessary to

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reach that goal in the very near future.

This year I can add that, despite the changes in the department and elsewhere in the Federal Government, the maximum development of civil aviation, both transport and personal, is still a major policy of this Administration. President Truman has stated so emphatically. Secretary Harriman of the Department of Commerce takes the same view. Of the hundreds of persons interested in flying to whom I have talked since war's end, I find an equal determination to advance civil aviation toward its ultimate goal—that of becoming one of our greatest American industries.

We are, in sum, all headed for that goal. I believe that our work, if properly co-ordinated, has horizons which are unlimited.

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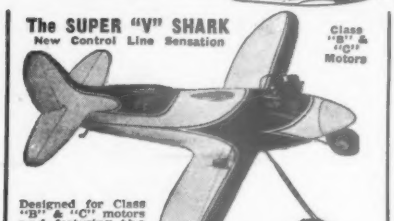

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Answers are at the bottom of the page.

1. *If you see an airplane flying overhead at night with the tail-light flashing alternately red and white, it is a*
A. military plane. B. private plane. C. airline transport.

2. *The pilot is flying due north with a strong east wind. He should*
A. hold constant left rudder to overcome plane's tendency to weathercock. B. fly with right wing slightly lower than left. C. handle the controls exactly the same as if there were no wind.

3. *The minimum age for obtaining a private pilot's license is*
A. 16 years. B. 17 years C. 18 years.

4. *If you were obliged to "hit the silk" and pulled the ripcord at 5,000 feet, to reach the ground it would take you*
A. 2 minutes. B. 5 minutes. C. 9 minutes.

5. *Airplanes are being designed to fly at supersonic speeds. The minimum speed necessary to meet this requirement is*
A. 500 m.p.h. B. 750 m.p.h. C. 1,000 m.p.h.

6. *A pilot decides to fly a landplane up the Mississippi River from New Orleans to Memphis. According to Civil Air Regulations, the lowest altitude that he may legally fly is*
A. 300 feet. B. 500 feet. C. low as he wants.

7. *The Tamiami Trail is an unbroken stretch of road running northwest from Miami through Fort Meyers, Fla., a distance of 120 miles. On a day when there is a 30 m.p.h. southeast wind, an automobile and an airplane start at the same time from Miami to make the round trip. The automobile maintains a constant 60 m.p.h. and the airplane flys a constant 70 m.p.h. airspeed. Which of the following would result?*
A. Both would return to Miami at the same time. B. The airplane would arrive a few minutes earlier. C. The auto would return a few minutes earlier.

8. *The purpose of dihedral in a wing or tail is to*
A. obtain greater speed. B. make plane more maneuverable. C. give better flight stability.

9. *If you take your plane out overnight, you would check the fuel tank and see that it is*
A. empty so that it can be filled with fresh fuel in the morning. B. not filled because of hazard of filling tank when engine is hot. C. full to prevent water from accumulating.

10. *During a full stall landing at La Guardia Field, N. Y., (sea level) your indicated airspeed is 60 m.p.h., but landing in Denver, Colo., your indicated airspeed is*
A. 60 m.p.h. B. 65 m.p.h. C. 70 m.p.h.

---

1. C—to offset drift, the plane would be headed somewhat to the right, but once the correct heading was established, the controls would be handled exactly as if there were no wind.
2. C—to offset drift, the plane would be headed somewhat to the right, but once the correct heading was established, the controls would be handled exactly as if there were no wind.
3. B.
4. B—an opened parachute drops at 1,000 f.p.m.
5. B—supersonic means "greater than the speed of sound." This speed varies but is in the neighborhood of 750 m.p.h.
6. C—in July, 1945, minimum altitude requirements were abolished for over-water flights.
7. C—by 12 minutes.
8. C. 9. C. 10. A.

The Case of the Unwanted Airport

(Continued from page 29)

bor who had expressed interest in learning to fly and owning his own plane, joined in the chorus of condemnation. He testified that he thought he'd have to move if the field remained, and his wife reported that her phone conversations were interrupted for as much as six minutes when a plane flew overhead.

Opponents of the field even introduced testimony against it by witnesses who confessed to having seen few if any planes overhead. Rose H. Hepburn, superintendent of Rush hospital for convalescents. a mile from the field and not in the traffic pattern, had seen no planes but thought the airport "would be detrimental." Father Joseph A. Grifferty, who had seen only one plane, believed that the airport would prove harmful to the Malvern Preparatory School which he heads.

For the defense, evidence was piled up showing that the planes were not as noisy as claimed, that buzzing had been done by planes alien to the field, that the field was a community asset.

History-making was the work and testimony of one witness, George LeRoy Pigman, CAA sound expert. Pigman was brought to the field to make tests by John H. Hoffman, AOPA lawyer-pilot. Hoffman spark-plugged the defense for the airport and directed Pigman's work, later characterized by T. P. Wright, CAA Administrator, as "a landmark in the field of scientific sound testing so far as aviation is concerned."

Pigman's tests showed that Mrs. Crew's six minutes delay on the phone could actually have been no more than that many seconds, Fairchild noise and speed being what they are. Other noises in the neighborhood were comparable.

"The maximum aircraft noise level to be expected is 88 to 89 decibels," Pigman testified. The level dropped off to as low as 70 decibels in the immediate neighborhood, tests showed. Truck traffic was as high as 90 decibels at a distance of 230 feet, with "passenger car generally 10 to 15 decibels lower." Ground vehicle noises were generally of longer duration, due to the superior speed of aircraft.

John MacFarland of the Pennsylvania Aeronautics Commission added to the testimony of the experts. He praised the field's location and its value in the statewide development of aviation. Civic groups concurred with petitions that it be permitted to operate.

The hearings lasted three days. Then W. Butler Windle, presiding judge of common pleas, who heard the case, postponed decision for three months, giving Malvern a lease on life until last September.

But as this goes to press the case was still in the courts. Windle had ruled against the airport and the only alternative for its friends was to appeal.

In the meantime, those who participated in the case have reached certain conclusions which might be helpful to anyone planning to open a field. As summed up by J. B. Hartranft, Jr., general manager of AOPA, who came into the case at the request of Mr. Hoffman, here are some of them:

1. Don't try to sell a field to a community—let the community sell the field to itself. If civic, veteran and other organizations had become active partisans in Malvern Project *before* the case went to court, many of the protesting neighbors might have been won over, and the diehards left without support.

2 Sell individuals living near the field on the values to them which may be gained by a nearby airport. Take them flying, sign them up for a plane or a flying course. Once they are participants in aviation, they are less likely to turn against it, as did Mr Crew.

3 Spend as much time as possible educating everybody in the community, from school kids to town fathers, on the facts about private flying—that it is safe, that it is not violently noisy. that it is an asset rather than a nuisance.

John Hoffman, lawyer of the Malvern case, adds a note of warning:

"If our experience is worth anything to lightplane aviation, it will succeed in getting across the pessimistic truth of the matter—don't start a community airport without expecting the worst. *Avoid errors, don't get mad, don't make enemies. But if enemies arise, one should be adequately prepared to defend oneself against them.*"

END

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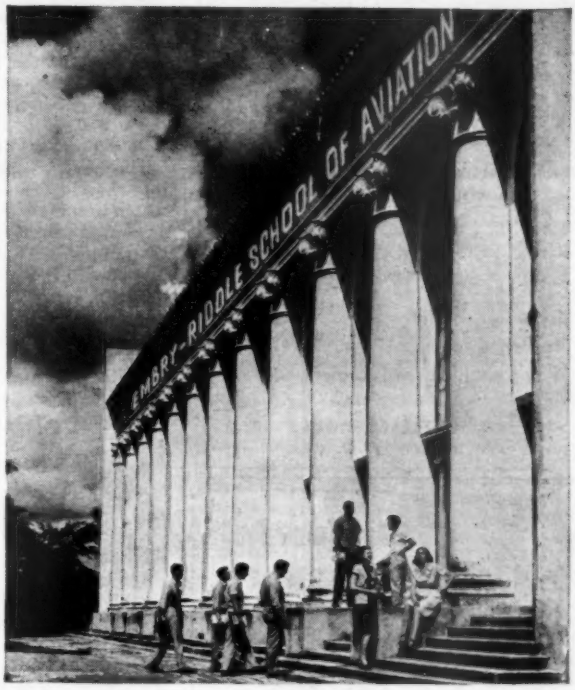

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I Learned About . . .

(*Continued from page 62*)

there was nothing below but rocky slopes and those railroad tracks.

It occurred to me that there was a chance back up the valley—there was level ground there. But could I turn before I struck the ground? I made the turn but lost the fight for altitude. The right gear struck a sagebrush hummock and the excess speed I had built up by use of full throttle tore it loose to hang limply along the fuselage's side.

The next few seconds were filled with that ripping, smashing nightmare of noise which accompanies the destruction of an airplane upon high-speed encounter with the ground. The plane must have done a cartwheel after the first impact, but I'm not sure.

Then there was quiet and I was hanging head down in the wreckage. I had cut the switch after primary contact with the ground, but I could see gasoline dripping from the battered engine cowl. I kicked and squirmed my way from the small window on the left side. The door had been jammed shut by the right wing which was pushed back against the fuselage.

After dragging my baggage from the wreck I sat down, suddenly weak. I was glad that I had escaped injury; disgusted that I had washed out my first plane. There in the sage brush was the end of a perfect five-year flying record. The same wind which had caused the *Cub's* downfall now sang its requiem through the twisted metal and torn fabric.

It was a long walk back to Fort Steele; there was plenty of time to think. When I started I was certain that I would never fly again. But by the time I arrived back at Lock Haven, I was ready to go again, a much wiser and a more cautious pilot than before. END

London Letter

(*Continued from page 59*)

by the French government of British gas turbines.

Charles Fevrier, well known air commentator, writing a leading article in *l'Aerophile* on the eve of the opening of the Show, urged consideration of the purchase of British gas turbines for French-designed aircraft.

Others have taken up the suggestion and negotiations going on at this writing suggest that sales may be affected. Eventually the Rolls-Royce gas turbines will be made by Hispano.

Jet Boat

One of the main points of interest in the new Saunders-Roe SR/A1 jet flying boat, is the fact that it uses Metro-Vick F2/4 axial flow gas turbines. This is a small diameter unit, and two are mounted side by side within the hull.

Conditions in the Pacific showed that a small fighter flying boat, if it could be given adequate performance, would be an aircraft of high tactical value. Its independence of fixed bases and its ability to make a forced landing on water without damage, are both in its favor for this theater.

So the validity of the fighter flying boat rests on whether enough performance can be obtained. Enclosing the two F2/4 jet engines within the hull should help to reduce drag and improve performance. The aircraft carries four 20-mm. cannon, and the pilot has a pressurized cabin forward of the wing. This is going to be a useful experiment. END

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Don't Waste Your Flying Time

(*Continued from page* 61)

fusion wrought at a busy airport by the careless pilot who doesn't correct for drift properly and drifts in the way of other planes. Learn to make a definite ground track. Fly the airplane, don't let it fly you!

Drift correction is even more important on approach and landing. At our school during the war we flew an airplane which had a "built-in" ground loop characteristic. If the pilot did not correct properly for drift on his approach and landing, it is an even money bet that he would ground loop. It had been our experience that among those who took our instructor refresher there wasn't one man in 10 who was able to perceive and correct for drift on landing. Most of these men had much time in their log books. This means they have wasted every landing in their books as far as drift correction goes. The day is past when you can come into the average airport for a landing and have the airfield all to yourself.

If you are unable to maintain a true ground track it will leave but one alternative—a collision track.

Unfortunately, most landings are not made directly into the wind. As a rule, the wind will be a little away from straight down the runway. When this happens, the airplane will be made to drift laterally over the ground. A wind 5° from straight is sufficient to cause this to happen. There are two methods of drift correction. One is by crabbing and the other is keeping one wing low. If the wind is violent enough, a combination of both may be used. In general, the wing low method is considered best for landings, because the landing can be completed in that attitude, whereas in the crab method the airplane must be kicked around straight before landing. In using the wing low method the wing should be lowered into the drift. A little opposite rudder should be carried to prevent the nose from turning toward the low wing. With proper application this will cause the airplane to slip into the wind in an amount to equal its sidewise wind drift. Try this the next time you fly and see how proficient you are at it.

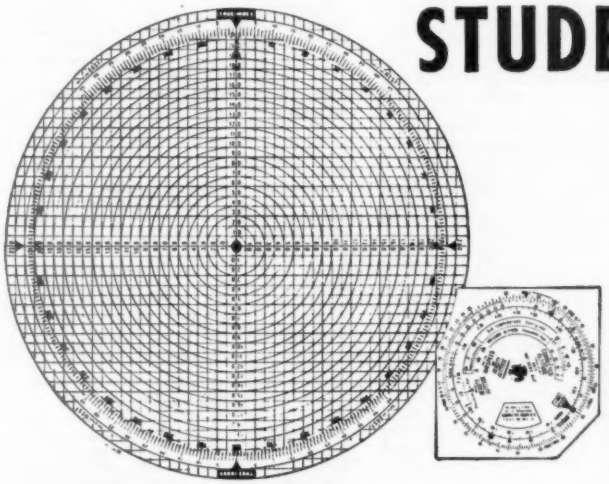
Acrobatics should be included in every pilot's experience. A few flyers have tried a loop or a wingover occasionally, but there are fewer who can do accurate slow rolls, snap rolls, Immelmans, half rolls, Cuban eights, vertical reversements and the various other maneuvers. The value of these maneuvers is in the confidence they build in the pilot. After reaching proficiency in them, the pilot is reassured to the point where he feels capable of handling the airplane properly in any position, or in any set of circumstances or conditions.

How many flyers are there running around today wondering what they would do if their airplane ever got on its back? Or again, how many flyers are there who wonder what would happen if they moved the controls in some unusual manner? Any person who flies should not have unanswered questions such as these floating around in his head. A person wouldn't be considered very well equipped to drive a car on the highway if he had never tried making a turn with it. It follows that a person is not well equipped to fly an airplane unless he knows what it will do, or how to control it, in any given position. He should be able to recover satisfactorily from any unusual attitude with a minimum amount of trouble.

Acrobatics are also beneficial to develop your co-ordination, reflexes, judgment and your "kinesthetic," or deep muscle senses—a term usually referred to as "feel."

You, who are putting out good, hard-earned money for your flying time, should take advantage of every minute in the air to better your technique, and you can't do it by joy riding. Analyze everything you do, and make sure you do it right. Broaden your scope and experience with acrobatics if possible, but don't do it unless you have the proper equipment and instruction available. Above all, never be satisfied with your technique.

When you reach the point at which you think there is nothing more for you to learn about flying, be assured the time has come for you to give it up. END



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1946 LUSCOMBE, 130, NC71366. Motor bulletin passed, hangared, like new, extras. $2495.00. Earl Case, Yankton, S. D.

LUSCOMBE 65, Continental. Purchased new June '46. Low hours. Will sacrifice. Reason for selling, no hangar space. $2195. LeRoy Johnston, 5305 Norwood, Kansas City, Kansas.

LUSCOMBE 8-A, 1946, 75 hrs. since new, $2500. Contact David Fuller, Warehouse Point, Conn.

LUSCOMBE 8-A, ferry time only. NC71953. Heater included. Best offer over $2500 takes it. Take car in trade. Anderson Charter & Flying Service Inc., Box 42, Lapel, Ind.

LUSCOMBE 8A's 1946 Models, your choice of five $2000 to $2500. All ships low time and A-1 condition. Salina Flying Service, Sky Village Airport, Salina, Kan.

MEYERS

1941 MEYERS, Warner 125. Excellent condition recently overhauled 100 hr. check. $1500. Fryer Airport, Villisca, Iowa.

NOORDUYN

TWO NOORDUYN Norsemen, licensed for day-night. Instruments, excellent condition. Total airframe and engine time 540:00-550:00 hours. Both planes for $25,000.00. Box 464, % Flying.

NORTH AMERICAN

AT-6. Good, newly licensed late models, radio, instruments, good canopies. One 138 hrs., one 64 hrs. since engine major, $1725.00 and $1825.00. Also one with large fuel tank. Aerographic Co., 830 Union St., New Orleans, La.

SNJ-3 NC66238, 1345 total, 237 since major on airplane, 706 total on engine with 240 since first major. Jam up good and clean all around with 3105 crystal radio, clock, new lights, nite and instrument airworthiness. Beautiful silver with deep blue trim. First $300 deposit gets it, balance of $1450.00 on delivery. Write, wire or phone 641-J. Hoffer's Flying Service, Camden, S. C.

LICENSED AT-6. Excellent condition. Very clean inside and out. Polished cowlings. Full radio and approved position lights. Southwestern Agency, Siloam Springs, Ark.

AT-6A, perfect condition, new tires, all instruments both cockpits, control surfaces recovered, licensed, 198 hrs. since engine major. Polished aluminum finish. $1875.00. P.O. Box 17, Redondo Beach, Calif.

NORTH American AT-6: 180 hours since first overhaul on engine and 140 hours since overhaul of airplane. Licensed August 1946. $1650. Augusta School of Aviation, Augusta, Georgia. Phone 2-3465.

PIPER

CRUISER 75 hp Continental 1216 total hours, 2 since new fabric and annual inspection in October. Engine 994 with 74 since major overhaul. Reconditioned propeller. Metallic blue with red trim. Sensitive altimeter. Deliver anywhere for expenses. Write, wire or phone 641-J. Hoffer's Flying Service, Camden, S. C.

65 HP PIPER Cub J3-L. Like new, brakes, navigation lights and skis. Perfect condition $1200.00. Will deliver for expenses. Deposit will hold for inspection. Hilton Flying Service, Hilton, N. Y.

1946 PIPER J3 Cub, like new, never cracked, 42 hrs. since major. Will sacrifice at $1585 since we are converting to Cessna 120 trainers. Standard Air Service, Glen Burnie, Md.

PIPER. New seaplane, without Wollam floats but with land gear. $2060.00; with floats $2800.00. John A. Cosgrove, 36 Richmond Terrace, Staten Island, N. Y.

SEAPLANE J3-L, 65, 1940. Airplane never cracked, recovered May 1946. Engine top condition, 200 hours on major. Contact Claude S. Nock, Jr., RFD No. 1, Lynhaven, Va. Phone Norfolk 52983.

1941 PIPER J4-E. Skis, pants, generator, extra tires, mechanical starter, lights. A beauty $1800. Northern Lakes Air Service, Box 26, Shawano, Wis. Phone 130J evenings.

PIPER J5-A. Three place, recovered and engine factory rebuilt. Licensed Aug. '46. 16 hrs. since relicense. Best offer over $2000. Walter Thomas, R. No. 3, Dixon, Ill.

PIPER J3, 1946, Continental 65, 150 hrs. total time since new. $1800, for quick sale. Albion Airport, S. Maine, Albion, N. Y.

PIPER J4 Coupe, latest pre-war model, blue and cream, 75 hp Continental, 650 hours total time, 370 since major. Best offer. Penn-Harris Airport, Harrisburg, Pa.

1946 PIPER Seaplane, J3-C65-Special, only six months old. 480 hours on plane, no time on engine since top overhaul. Navigation lights, intercom system, emergency equipment. Wheels with brand new tires included. New propeller. Plane in perfect condition, ready to go. Will deliver anywhere in U.S. for expenses. Wire your offer. Wolverine Air Service, Comstock Park, Mich.

PIPER Coupe, Cont. 65, relicensed, 10 hours since major, new prop, auxiliary tank, pants, receiver, wings recovered. $1500.00. Write Roland Church, Rose City, Mich.

CUB J3, NC38533, 65 hp Lycoming. Aircraft: 2171:00 since new, engine 2171:00 total; 545 since overhaul. Airplane completely overhauled and recovered in 1944. Ship looks almost like new. Excellent bargain at $1550.00. James B. Levert, Crescent City Airways, New Orleans Airport, La.

CUB J3, NC35768, 65 hp Lycoming. Aircraft: 1740:00, engine: 1740:00 total, 310 since overhaul. Aircraft completely recovered and repainted September 1944. Ship in excellent shape. Bargain at $1475.00. James B. Levert, Crescent City Airways, New Orleans Airport, La.

PIPER J5. Handrubbed finish. Clean ship. Wheel pants and strut cuffs. 967 hours on ship, 210 hours on engine since major. Fresh periodic, $2150. Brown Deer Airport, Milwaukee 9, Wis.

1941 CUB J3, 65 hp. Lights, brakes. $1000. Conway Valley Airport, Conway, N. H.

PIPER J5B Cruiser, majored engine, ship licensed and ready to go. $1500. Salina Flying Service, Sky Village Airport, Salina. Kansas.

PIPER J3 1946. 250 hrs. since new. $1775. John Ostrander, Gowanda Airport, Gowanda, N. Y. Phone 910F5.

CUB Cruiser J-5 late 1940 Model. Good performance with 3 people. Only 30 hrs. since major and always hangared. Price $1975.00. Kerrville Flying Service, Kerrville, Tex.

CUB, J-2, excellent condition, fuselage recovered '45, wings in '46, motor majored, relicensed July 4. $795. Donald Jones, Weirton Airport, Weirton, W. Va. Phone 72-J.

PIPER Cub J3 only 56 hrs. since Major. $1400. Inquire Crawford Flying Service, Berlin, Wis. Phone 117 WX.

PIPER Cub J3: 50 hrs. since top, Lycoming 65. New lifetime windshield. New side windows, new control cables, new steerable tail wheel. Fabric good. Ship just relicensed. $1595. Ferry up to 200 miles. Valley Flying Service, Salem Municipal Airport, Salem, Ore. Phone Salem 3023.

PIPER Cub coupe with 65 hp. Continental engine. 75 hrs. since overhaul. Fabric one year old. Just relicensed. $1595. Arkansas Aviation Service, Grider Field. Pine Bluff, Ark.

J-3F65, NC40950, clean throughout, 100 hours since majored. $1195. Beaty Air Sales, Independence, Iowa.

THREE Cubs, $900 up, very clean. Stillwater Flying Service, Stillwater, Okla.

PORTERFIELD

PORTERFIELD 35.70. Recently relicensed. 22 hours since 100 hr. New pyrolyn throughout. New tires, prop. last spring. May be seen and flown at Brainard Field by appointment. Call Slim Coxx. Phone East Hartford, 8-5421, Conn. Best offer over $700.00 takes it.

THREE Porterfields, excellent condition, low time, all relicensed; priced as low as $1250. Stillwater Flying Service, Stillwater, Okla.

REARWIN

REARWIN Cloudster, Instrument Trainer 8135T, 120 Ken-Royce. Built 1942. Low Time. 22 hours since overhaul. Gyro horizon, directional gyro, and all other flight and engine instruments. Generator. Trail and fixed antennae. Newly finished. Maintained by Pan American Airways. Cruises 120. Inexpensive to operate. Just the instrument trainer for a G. I. Program. Price $2,950. The Coogan Company, 8440 Sunset Blvd., Hollywood 46, Calif.

RYAN

RYAN ST-3KR: Licensed in May. Very clean, low time. $1700.00. I. D. Keener, 209 Ponce De Leon Ave., Montgomery, Ala.

RYAN PT-22: $1650. No time since overhaul on engine and relicensing of airplane. Augusta School of Aviation, Augusta, Georgia. Phone 2-3465.

STEARMAN

STEARMAN PT17, built 1943. Just relicensed for another year. Fabric, plane, A1 condition. 770 hrs. engine. Hangared Ft. Wayne, Ind. A clean plane priced reasonably at $990 cash. Consider trade for car. Deliver for expenses. Wire, write R. V. Wilkens, 712 W. Jefferson St., Ft. Wayne, Ind.

PT-17. Only 168 hours since engine overhaul. Just relicensed and refinished in red dope and silver. New wood propeller and hub. Spars inspected. Believe it to be cleanest Stearman in country. Price $1,450.00. Coogan Company, 8440 Sunset Blvd., Hollywood 46, Calif.

PT-13, low time, very clean, $1450. Stillwater Flying Service, Stillwater, Okla.

STEARMAN PT-17, Continental 220. NC-51807, 182 hrs. on engine since major. Excellent condition throughout. Licensed Aug. 1946. Priced for quick sale, $1350. Airplane being sold to make room for new ships. Daniel Webster Airways, Inc., R.F.D. 1, Nashua, N. H. Tel. Nashua 1080.

STEARMAN PT-13. Licensed NC52750. Beautiful maroon and cream. Price $1395. Air Progress, Inc., Wilmington, N. C.

STEARMAN, N2S3. Just licensed. New fabric, hand-rubbed finish. Yellow with blue trim. 350 hrs. since major. Price $1395. W. C. King Co., Municipal Airport. Iola, Kan.

STINSON

STINSON AT-19. Complete with upholstery kit, including windows, seats, seatbelts, Airfoam cushions, etc. Unlicensed, $4000. Brown Deer Airport, Milwaukee 9, Wis.

STINSON SR-10J: Just relicensed. 1185:00 total time, never on program. New Lycoming 295 horse power, 106:00 since new with Hamilton constant speed prop. 3-place, full blind flight group with new Sperry gyro, transmitter, receiver, manual loop by RCA. Lux engine extinguisher, flares, landing lights, new tires. Most beautiful clean ship of this type in country. Must be seen to be appreciated. Licensed day and night instrument. $10,500. Will accept trade. Hempel, Box 41, Lambert Field, Mo.

STINSON, 1935 model SRJR (Special), cleanest 4 place in the country. NC13831. 215 hp. Lycoming. Approx. 150:00 since major overhaul airplane and engine. Relicensed Aug. 1946. Red hand-rubbed finish with new genuine leather upholstery. Outside baggage door. New tires, wheel pants, flares, primary instrument group. Retractable landing light, starter, and generator. Navigation lights, Hamilton standard prop. Has to be seen and flown to be appreciated. Call or write. Fred Kingdon or Howard Webb, Twin City Airways, Municipal Airport, Texarkana, Ark. Phone 1500. Price $3900.

STINSON Voyager 150, NC97422. 1946, perfect condition, never cracked. 65 hrs. total time, aircraft and engine. GE receiver and transmitter, landing lights, etc. Owner buying larger ship. First offer $5500. Wire, phone, or write. Connecticut Valley Air Service, Whitefield, N. H.

STINSON HW-75. New fabric, maroon and white trim, new upholstery, Plexiglas windshield, blind flying instruments, motor checked. For further details write: Casey Jones Flying Service, Ontario, Ore. $2600.00.

STINSON 10A Voyager, only 435 hrs. since new. Franklin 90 just overhauled, relicensed, two gas tanks, blind flying instruments, 1946 Motorola two-way Avigator radio with marker beacon receiver. Private owner. First offer $2900 accepted. Buying larger plane. F. W. Walker, Greyhound Corp., Chicago, Ill. Telephone Wabash 3770.

STINSON V-77, NC55755, 300 hp Lycoming, 8:40 total time on aircraft and engine since new. Aircraft in perfect shape. Two-way radio, radio compass, constant speed prop, baggage compartment, color canary yellow, black trim. Really a beautiful ship. Best looking Stinson in South. Will sacrifice for $9500.00. James B. Levert, Crescent City Airways, New Orleans Airport, New Orleans, La.

STINSON SR-9E privately owned. No time since major overhaul on engine and airframe. Also recovered. Hand rubbed finish—green and yellow. Complete set of instruments, two-way radio. Ship reupholstered in tan, seats tan leather. John Fulton, 1041 North Formosa, Hollywood, Calif.

STINSON AT-19, Gull wing Reliant type. New airplane reassembled from original export crate and completely converted to beautiful 5-place civilian plane. Fully sound-proofed, upholstered interior. General Electric radio transmitter and receiver with speaker. Complete blind instruments. Total 11 hours on aircraft engine and propeller. $6445.00. Standard Air Service, Glen Burnie, Md.

SPARTAN Executive, 450 h.p. P. & W. Wasp Jr. Excellent condition; equipped with full set of instruments, 2-way radio and Lear ADF. AiResearch Manufacturing Co., 9851 Sepulveda Blvd., Los Angeles 45, Calif.

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1946 TAYLORCRAFT airplane in same as new condition; has Continental 65 engine dual ignition and dual controls. Plane always hangared, has 80 hours. Has extras as well as skiis for winter. Sacrifice at $2375 complete as is. Edward Karpinski, Box 276, Nekoosa, Wisconsin.

1943 TAYLORCRAFT L2-B. Wings and control surface recovered last fall. About 20 hrs. since motor overhauled. No time since 100 hr. inspection. Licensed for another year of good flying. Will deliver anywhere for expenses. Price, for quick sale, $1400. Leslie Bennett, Box 362, River Mines, Mo.

1941 TAYLORCRAFT Deluxe Coupe, 75 hrs. since major, wings recovered, fuselage rejuvenated. A beautiful personal airplane in fine condition for $1595.00. Standard Air Service, Glen Burnie, Md.

TAYLORCRAFT BL-65, mfg. Nov. 1940. Total time 760 hours, 20 hours since engine major, red with black trim, very good condition. Highest offer. Harrisburg Air Service, Inc., Penn-Harris Airport, R.D. No. 1, Harrisburg, Penna. Phone 39458.

TAYLORCRAFT L-2M. Licensed October, 1946. Silver with red trim finish, engine and aircraft total time 310 hrs. Excellent condition throughout, radio receiver installed, transmitter, generator and battery included. New Scott tailwheel installed when licensed. Has sensitive altimeter, 8 day clock, outside air temperature and regular instruments. Always hangared, $1700.00. W. S. Karr, 1410 W. Saginaw, E. Lansing, Mich. Phone 42592.

1941 TAYLORCRAFT BFS-65 seaplane on 1320 Edo Floats, $3500.00. Tom Emerson, City Yacht Basin, Coeur d'Alene, Idaho. Phone 805.

TAYLORCRAFT trainer DC model, just had annual, $1575. Stearman PT-17, licensed, good engine, $750. Aeronca Champion, 187 hrs. since new, $2000. Watonga Flying Service, Watonga, Okla.

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TIMM N2T1. Fastest and best flyer in PT class. Engine and aircraft excellent condition. Complete standard equipment plus some extras. Refinished blue dulux, licensed, $1550.00. J. Carter, Gentry Lane, Charlottesville, Va.

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BT-13. TOTAL engine time 144 hours, airplane 1975 with all paint removed, practically all bulletins complied. Former CAA airplane. All paint removed, all new fabric, almost new tires, all clear hatch, $900.00. Hoffer's Flying Service, 641-J, Camden, S. C.

BT-13: Licensed day and night. All-metal. 900 total A&E; 140 since engine major. Polished. $1495.00. Eppler, 411 Long, Chicago, Ill.

VULTEE Navy SNV-1. 100 hour check, modification and licensing just completed. Only 225 hours on engine since major. Excellent condition. Contact: N. E. Flint, Defiance, Ohio.

BT-13. $950.00. Very good buy. All instruments and radio, 200 hrs. since major. Conway Valley Airport, Conway, N. H.

SNV-2 MANUFACTURED 1944. Licensed NC64738 June 1946. Airframe and Pratt Whitney built engine 746 total, 151 since overhaul. Radio modified, new paint, all bulletins complied. Full sets instruments including Marker Beacon. Must sell $1650 or will trade for lightplane, late car or Army Jeeps. Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Okla.

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WACO

WACO ZQC-6, 285 hp. Jacobs, two position Ham. prop. 5 place 100 lbs. baggage, blind flight group, two way radio with loop,wings just rebuilt and recovered and ship relicensed. This plane is in top condition throughout. Make offer, will take car in trade. Will deliver for expenses. Anderson Charter & Flying Service, Inc. Box 42, Lapel, Indiana.

WACO UPF-7 three place; only 120 hrs. on engine since overhaul. Licensed. Good condition. $1295. Arkansas Aviation Service, Grider Field, Pine Bluff, Ark.

WACO UKC, 5 place: Continental 220 h.p. Relicensed in August 1946. $3950. Airplane completely overhauled and recovered January 1946. Engine 300 hours since factory overhaul. Augusta School of Aviation, Augusta, Georgia. Phone 2-3465.

WACO ZQC-6, five place Custom, 285 Jacobs engine with only 56 hrs. time since major; total airplane hours 809; two-way radio; landing lights; complete instrument panel; wheel pants. Airplane in A-1 condition. A bargain at $3900. Aircraft Service Co., Phone 527, P.O. Box 829, Boise, Idaho.

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VULTEE owners: Do you need parts for your BT-13, SNV, or BT-15? We have them. Engines, propellers, landing gears, tail struts, starters, instruments, radios, or any other item you may need. We are cannibalizing a large number of these airplanes. Write or wire us. Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas.

FOR SALE: 1 Kinner R-5 engine, 160 H.P., No. 1 tapered shaft. 1 Hamilton propeller, like new, No. 1 tapered hub, 165 H.P., 1 Curtiss-Reed propeller, like new, No. 1 tapered hub; 160 H.P., 1 Hamilton propeller, tapered hub; 100 H.P. Inquire Earle S. Eckel, Box 42, Washington, N.J.

ALL new materials salvaged from Government surplus. Gliders priced below list. 27 inch tires, tubes and wheels, 12 volt batteries and landing lights, altimeters, compasses, turn and bank indicators, airspeed rate of climb, landing gears with hydraulic brake and tail wheel assemblies. Write for complete list and prices to S. R. Carse, Jr., 1036 Norwich Ave., Pittsburgh 26, Penna.

BT STABILIZER fittings for compliance with bulletin 2-2-209 for metal stabilizers $9.75 per set. Brandt, Perkins & Brandt, Alicia Airport, Marysville, Calif. Phone 2843.

WANTED: 1 set of floats for Noorduyn Norseman. G. L. Fisher, 221 N. 1st St., Minneapolis 1, Minn.

ERCOUPE right wings, three available, immediate shipment, one new, two used, but perfect. One Continental 75, 18 hrs. since new, available immediately, other miscellaneous parts for Ercoupe. Hugh W. Wheelless, Dothan Aviation Co., Dothan, Alabama.

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ARMY Air Force Type A-2 Computer now available, $2.00; Mark II (Weems) Navigation Plotter, $2.00; Dalton Navigational Computer with book of instructions, $5.00; New Type "C" American Airlines in fine leather case with instructions, $5.00; E-6B Army Type Navigational Computer with leather case and Instructions, $10.00; Link (Bubble Type) Sextant in carrying case, $230; Aviation Sun Glasses, $12.00. Dealers: new catalog now ready—Write for agency Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood, Calif.

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NEW B2 Pilot Caps, dark brown leather, sheepskin lined, long visor $3.75, B3 Pilot Jackets, accrolite leather, sheepskin lined, zippered $32.95. A-11 A. A. F. Aviators leather Helmets with sponge rubber ear cups $3.45. Pilot Gauntlets, dark brown goatskin, one finger mitten type, baby lamb lined, $12.50. Pilot Boots-A6 Army type, dark brown, sheepskin lined, zippered $16.95. G. I. Khaki wool gloves, leather palms, $1.95. Regular wool knit gloves 95c. Wallets, Genuine Morocco leather, six compartments $2.25. Genuine brown calf wallet, the finest, $5.40, License Cases-P1-genuine morocco leather $1.80. P-2 sheepskin leather $1.30. 20% Federal excise tax applies on wallets and license cases. Fischer Goggles—Broadview, glareproof lenses $21.00, clear $18.00. Clearflight-glareproof $17.50, clear $15.00. Skyway, glareproof $14.50, clear $12.00. Compass, Longines—Wittnauer Pocket Watch type $2.25. Flying Equipment Sales Co., 1641-3 W. Wolfram St., Chicago 13, Ill.

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C.A.A. MECHANIC'S wings, lapel pin ¾ inch, 14K gold plate, price $1.25 each. Tie clasps $2.00, rings and identification bracelets. Mail order & C.O.D. Aero Mech. Training Supply Co., 1546 Quince, Denver, Colo.

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YOUR name and wings in 23 karat gold on leather patch, Military, AOPA or Civilian, $1.00 each, 3 for $2.00. Names only 2 for $1.00. Julie's Leathercraft, Lone Tree, Iowa.

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ALL AIRCRAFT LISTED ARE LICENSED

DEALER	MODEL NO.	TYPE ENGINE	YEAR BUILT	TOTAL HOURS		HOURS SINCE LAST MAJOR OVERHAUL		PRICE
				PLANE	ENGINE	PLANE	ENGINE	
AERONCA								
Crescent City Aviation, Memorial Field, Evansville, Indiana	11AC	Cont. 65	1946	25	25	25	25	$2,900.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	Chief	Cont. 65	1946	10	10	10	10	2,600.00
Castner Flying Service, Princeton Airport, Princeton, Illinois	11AC	Cont. 65	1946	60	60	60	60	2,600.00
C. G. Frye, Anadarko Air Port, Anadarko, Oklahoma	11AC	Cont. 65	1946	70	70	70	70	2,545.00
Blackwell Flying Service, Municipal Airport, Vale, Oregon	7AC	Cont. 65	1941	100	100	100	100	2,440.00
Weiser Flying Service, Weiser Municipal Airport, Weiser, Idaho	7AC	Cont. 65	1946	50	50	0	0	2,400.00
Weiser Flying Service, Inc., Weiser Municipal Airport, Weiser, Idaho	7AC	Cont. 65	1946	340	340	0	0	2,400.00
Bush Aviation Enterprises, Bush Airport, Jeffersonville, Indiana	Chief	Cont. 65	1946	40	40	40	40	2,400.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	Champion	Cont. 65	1946	10	10	10	10	2,400.00
Neosho Commercial Airport, Claude Elliott, 210 E. Spring St., Neosho, Missouri		Cont. 65	1946	92	92	92	92	2,350.00
Sparta Flying Service, 511 West Main Street, Sparta, Wisconsin	7C	Cont. 65	1946	150	150	150	150	2,300.00
Chastain's Flying Service, P. O. Box 248, Prichard, Alabama	7AC	Cont. 65	1946	247	247	0	0	2,250.00
Blair County Aviation Co., Altoona Blair County Airport, Martinsburg, Pennsylvania	7AC	Cont. 65	1946	120	120	120	120	2,250.00
Victory Sky Pilots, Inc., Box 444, Winona Lake, Indiana	Champion	Cont. 65	1946	498:30	498:30	498:30	498:30	2,200.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	Champion	Cont. 65	1946	150	150	150	150	2,200.00
Gate City Airport, Route 3 at New Hampshire-Massachusetts State Line, South Nashua, New Hampshire	7AC	Cont. 65	1946	485	485	485	485	2,150.00
E. O. Champion Air Service, Oxford, Mississippi	11AC	Cont. 65	1946	80	80	80	80	2,150.00
Culbertson Aviation, Parker Cramer Airport, Clarion, Pennsylvania	7AC	Cont. 65	1946	155	155	155	155	2,150.00
Charles Harris, Jr., Box 365, Versailles, Missouri	7AC	Cont. 65	1946	220	90	220	90	2,100.00
Hughes Flying Service, Capital City Airport, Lansing, Michigan	CA	Cont. 65	1941	1333	1143	16	2	2,075.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	Champion	Cont. 65	1946	250	250	250	15	2,000.00
E. O. Champion Air Service, Oxford, Mississippi	7AC	Cont. 65	1946	200	200	200	200	2,000.00
Crescent City Aviation, Memorial Field, Evansville, Indiana	7AC	Cont. 65	1946	350	350	350	350	2,000.00
Claud A. Akin, Box 342, Danville, Kentucky	7AC	Cont. 65	1946	3:10	3:10	3:10	3:10	2,000.00
Tri Angle Airport, Cross Keys, Sewell, New Jersey	7AC	Cont. 65	1946	360	360	360	360	1,950.00
Attica Flying Service, Inc., Attica, Indiana	7AC	Cont. 65	1946	300	300	90	90	1,950.00
Tri Angle Airport, Cross Keys, Sewell, New Jersey	7AC	Cont. 65	1946	420	420	420	420	1,900.00
Pierce Aviation Company, Municipal Airport, Fort Wayne, Indiana	Chief	Lyc. 65	1941	270	270	270	270	1,850.00
Claud A. Akin, Box 342, Danville, Kentucky	7AC	Cont. 65	1946	87	87	87	87	1,800.00
Claud A. Akin, Box 342, Danville, Kentucky	7AC	Cont. 65	1942	65	65	65	65	1,800.00
W. P. Cook, Box 41, Alcoa, Tennessee	7AC	Cont. 65	1946	350	350	350	350	1,800.00
W. P. Cook, Box 41, Alcoa, Tennessee	7AC	Cont. 56	1946	600	600	600	100	1,800.00
C. G. Frye, Anadarko Airport, Anadarko, Oklahoma	7AC	Cont. 65	1946	529	415	529	118	1,800.00
French Aero Service, Washington Airpark, Washington Court House, Ohio	LB	Le Blond 90	1937	400	400	100	50	1,800.00
Claud A. Akin, Box 342, Danville, Kentucky	7AC	Cont. 65	1946	44	44	44	44	1,800.00
French Aero Service, Washington Airpark, Washington Court House, Ohio	7AC	Cont. 65	1946	290	290	290	290	1,795.00
Crescent City Aviation, Memorial Field, Evansville, Indiana	CA	Cont. 65	1941	1100	1100	200	125	1,795.00
Chastain's Flying Service, P. O. Box 248, Prichard, Alabama	7AC	Cont. 65	1946	602	602	0	0	1,795.00
Chastain's Flying Service, P. O. Box 248, Prichard, Alabama	7AC	Cont. 65	1946	651	324	0	0	1,795.00
Hughes Flying Service, Capital City Airport, Lansing, Michigan	CA	Cont. 65	1941	1083	937	1083	330	1,775.00
Victory Sky Pilots Inc., Box 444, Winona Lake, Indiana	65BB	Cont. 65	1943	1156:15	1158:45	400	164	1,750.00
Claud A. Akin, Box 342, Danville, Kentucky	Chief	Cont. 65	1941	593	593	10	10	1,700.00
Weimer's Flying Service, Manchester Airport, North Manchester, Indiana	Chief	Cont. 65	1941	519	519	19	19	1,700.00
Air City, Inc., Sturtevant, Wisconsin		Lyc. 65	1941	1460	1743	23	66	1,700.00
Luther Flying Service, Salix Airport, Salix, Pennsylvania	7AC	Cont. 65	1946	446	446	446	446	1,700.00
French Aero Service, Washington Airpark, Washington Court House, Ohio	7AC	Cont. 65	1946	600	600	600	100	1,695.00
French Aero Service, Washington Airpark, Washington Court House, Ohio	7AC	Cont. 65	1946	600	600	600	50	1,695.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	Champion	Cont. 65	1946	233	30	233	30	1,695.00
Gottschalk Aviation, 402 South Winter Street, Adrian, Michigan	7AC	Cont. 65	1946	900	300	900	300	1,600.00
Chastain's Flying Service, P. O. Box 248, Prichard, Alabama	7AC	Cont. 65	1946	562	215	0	0	1,600.00
Wade Flying Services, Inc., Bowman Field, Louisville 5, Kentucky	7AC	Cont. 65	1946	841	751	841	751	1,595.00
Victory Sky Pilots Inc., Box 444, Winona Lake, Indiana	TAL	Lyc. 65	1940	2219:40	892:30	2219:40	200	1,500.00
Raymond Brooks, Box 146, North Manchester, Indiana	TAF	Frank. 65	1942	2519:32	1606:29	22:41	434:47	1,500.00
Wade Flying Services Inc., Bowman Field, Louisville 5, Kentucky	7AC	Cont. 65	1946	959:25	959:25	959:25	251:05	1,550.00
Wallace Flying Service, Box 67, Wallace, North Carolina	TF	Frank. 65	1941	1200	1200	150	0	1,500.00
Chastain's Flying Service, P. O. Box 248, Prichard, Alabama	CA	Cont. 65	1941	1507	891	311	63	1,495.00
Luther Flying Service, Salix Airport, Salix, Pennsylvania	TAC	Cont. 65	1941	1476	1369	406	406	1,300.00
Bahnman Aviation Company, Commerce, Texas	TL	Lyc. 65	1940	625	818	225	218	895.00
BEECH								
Challenger Airlines Inc., 518 Felt Building, Salt Lake City, Utah	D18S	P & W 450	1946	298	298	298	298	58,500.00
Neosho Commercial Airport, 210 East Spring Street, Neosho, Missouri	330	Jacob 330	1939	3170	385	3170	385	13,000.00
Bucyrus Flying Service Airport, Bucyrus, Ohio		Frank. 150	1946	4	4	4	4	6,300.00
CESSNA								
The Coogan Company, 8440 Sunset Boulevard, Hollywood 46, California	T-50	Jacobs 225	1943	1495	0	0	0	15,500.00
Bush Aviation Enterprises, Bush Airport, Jeffersonville, Indiana	UC-78	Jacobs 225	1943	1250	1250	1250	300	8,595.00
Carolina Aero Service, Inc., P. O. Box 57, Anderson, South Carolina	UC-78	Jacobs 225	1942	479	479	25	25	7,000.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	T-50	Jacobs 225	1944	932	636	105	636	6,500.00
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	UC-78	Jacobs 225	1943	1380	1655	102	302	5,750.00
Paul Swaim, Box 199, Eagle Pass, Texas	C-37	Warner 145	1937	987	710	0	20	5,700.00
Blair County Aviation Co., Altoona Blair County Airport, Martinsburg, Pennsylvania	T-50	Jacobs 225	1941	340	340	250	250	5,200.00
Farly's Air Park, Box 72, New Baltimore, New York	UC-78	Jacobs 225	1944	375	250	200	200	3,995.00
COMMONWEALTH								
Timm-Larson Aircraft Company, Chandler Field, Fresno, California	L85	Cont. 85	1946	300	300	300	300	2,950.00
CULVER								
Reed Flying Service, Box 100, Wewoka, Oklahoma	LFA	Frank. 80	1941	250	230	250	250	2,500.00
ERCOUPE								
Bucyrus Flying Service Airport, Bucyrus, Ohio	415	Cont. 75	1946	40	40	40	40	3,650.00
Carbon-Emery Flying Service, Box 629, Price, Utah	415	Cont. 75	1946	152	152	152	152	3,150.00
Bush Aviation Enterprises, Bush Airport, Jeffersonville, Indiana	415	Cont. 75	1946	175	175	175	175	3,000.00
Flite-Ways, Inc., Blue Earth, Minnesota	415	Cont. 75	1946	140	140	140	140	2,850.00
Lehigh Aircraft Co., Allentown-Bethlehem Airport, Allentown, Pennsylvania	415	Cont. 75	1946	400	400	400	400	2,800.00
Claud A. Akin, Box 342, Danville, Kentucky	415	Cont. 75	1946	93	93	93	93	2,750.00
Syracuse Flying School, Syracuse Airport, Syracuse, New York	415	Cont. 75	1946	315	315	315	30	2,740.00
Amsterdam Flying Service, Inc., Amsterdam Airport, RFD4, Amsterdam, NewYork	415	Cont. 75	1946	45	45	45	45	2,700.00
Millis Air Service, Mendon, Massachusetts	.....	Cont. 75	1946	55	55	55	55	2,650.00
Francis Rogers, Route 2, Queen City Airpark, Springfield, Missouri	415	Cont. 75	1946	280	280	280	280	2,450.00

DEALER	MODEL NO.	TYPE ENGINE	YEAR BUILT	TOTAL HOURS		HOURS SINCE LAST MAJOR OVERHAUL		PRICE
				PLANE	ENGINE	PLANE	ENGINE	
FAIRCHILD								
Culbertson Aviation. Parker Cramer Airport, Clarion, Pennsylvania	24	Warner 165	1946	63	63	63	63	$8,250.00
The Coogan Company, 8440 Sunset Boulevard, Hollywood, California	24-R-40	Ranger 175	1940	466	466	66	66	4,850.00
Amsterdam Flying Service, Inc., Amsterdam Airport, R. D. 4, Amsterdam, New York	C-8-C	Ranger	1934	1663	1663	1663	1663	4,500.00
Crescent City Aviation, Memorial Field, Evansville, Indiana	24-H	Ranger 150	1937	1050	450	1050	75	3,995.00
Bucyrus Flying Service Airport, Bucyrus, Ohio	C8C	Warner 145	1935	850	850	5	280	3,600.00
Culver Flying Service, Inc., Municipal Airport, Evansville, Indiana	PT-26	Ranger 200	1943	317	317	60	60	3,000.00
Hanford Aero Service, Municipal Airport, Hanford, California	PT-23	Cont. 220	1944	395	150	35	150	1,800.00
Chardon Airways Inc., Chardon, Ohio	PT-19	Ranger 175	1943	483	483	483	50	1,650.00
Ravenna Air Service, Meadowview Airport, Ravenna, Ohio	PT-19	Ranger 175	1943	650	750	240	240	1,600.00
Pierce Aviation Company, Municipal Airport, Ft. Wayne, Indiana	PT-19	Ranger 175	1943	1757:30	785:35	259	259	1,500.00
Crescent City Aviation, Memorial Field, Evansville, Indiana	M-62	Ranger 175	1943	689	689	50	50	1,500.00
Stockton Airport, Stockton, Illinois	M62A	Ranger 175	1943	1000	600	50	600	1,400.00
Culver Flying Service, Inc., Municipal Airport, Evansville, Indiana	PT-19	Ranger 175	1943	984	296	25	296	1,400.00
United Aviation Corporation, Somerset Hills Airport, Basking Ridge, New Jersey	M62A	Ranger 175	....	816:15	207	816:15	207	1,250.00
Goods Flying Service, Edna, Texas	PT-19	Ranger 175	1943	650	1500	650	50	1,290.00
GLOBE								
Gillis Flying Service, Box 1718, Billings, Montana	GC-1B	Cont. 125	1946	30	30	30	30	4,500.00
HOWARD								
The Coogan Co., 8440 Sunset Boulevard, Hollywood 46, California	DGA	P & W 450	1943	460	460	0	0	10,500.00
INTERSTATE								
Virginia Aircraft Sales Co., Inc., Martinsville, Virginia	S1B1	Frank. 113	1942	174:20	92:15	174:20	92:15	2,250.00
LUSCOMBE								
Syracuse Flying School, Syracuse Airport, Syracuse, New York	8A	Cont. 65	1946	120	120	120	120	2,995.00
Pierce Aviation Company, Municipal Airport, Fort Wayne, Indiana	8A	Cont. 65	1946	50	50	50	50	2,900.00
Pierce Aviation Company, Municipal Airport, Fort Wayne, Indiana	8A	Cont. 65	1946	50	50	50	50	2,900.00
Flite-Ways, Inc., Blue Earth, Minnesota	8A	Cont. 65	1946	41	41	41	41	2,895.00
Blackwell Flying Service, City Airpark, Vale, Oregon	8A	Cont. 65	1941	105	105	105	105	2,840.00
John L. Coppernoll, Stockton, Illinois	Silvaire	Cont. 65	1946	50	50	50	50	2,800.00
Pierce Aviation Company, Municipal Airport, Fort Wayne, Indiana	8A	Cont. 65	1946	125	125	125	125	2,750.00
Syracuse Flying School, Syracuse Airport, Syracuse, New York	8A	Cont. 65	1946	300	300	300	25	2,700.00
Attica Flying Service, Inc., Attica, Indiana	8A	Cont. 65	1946	79	79	79	79	2,650.00
Pierce Aviation Company, Municipal Airport, Fort Wayne, Indiana	8A	Cont. 65	1946	200	200	200	200	2,600.00
Hobley-Maynard Air Service, Inc., N. O. Airport, New Orleans, Louisiana	8A	65 HP	1946	150	150	150	150	2,550.00
Hobley-Maynard Air Service, Inc., N. O. Airport, New Orleans, Louisiana	8A	65 HP	1946	63	63	63	63	2,550.00
Spartan School of Aeronautics, Municipal Airport, Tulsa, Oklahoma	8C	Cont. 75	1940	1215	250	1215	250	2,475.00
Hughes Flying Service, Capital City Airport, Lansing, Michigan	8C	Cont. 75	1941	1052	1015	1052	525	2,250.00
NORTH AMERICAN								
Airport Manager, Box 73, Blacksburg, Virginia	SNJ-3	P & W 650	1943	1200	830	28	32	2,650.00
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	AT-6A	P & W 550	1941	5234	2056	5234	167	2,475.00
Pacific Airmotive Corp., Lockheed Air Terminal, Burbank, California	AT-6	P & W 1340	1941	884:50	884:50	6:35	79:10	2,247.00
Edward Lavins, 423 Second Street, Piqua, Ohio	1340	P & W 650	....	2516:10	918:30	2593:40	77:30	2,000.00
Aerographic Co., 830 Union Street, New Orleans, Louisiana	SNJ-2	P & W 550	1941	2280	1490	466	466	1,575.00
Aerographic Co., 830 Union Street, New Orleans, Louisiana	SNJ-4	P & W 550	1942	2730	1180	728	63	1,775.00
Aerographic Co., 830 Union Street, New Orleans, Louisiana	SNJ-4	P & W 550	1943	3300	1200	1330	139	1,725.00
PIPER								
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	PA-12	Lyc. 100	1946	60	60	60	60	3,075.00
Lambros Seaplane Base, Ridgefield Park, New Jersey	J3-S	Cont. 65	1946	400	400	400	200	2,600.00
R. E. Lee, P. O. Box 829, Rocky Mount, North Carolina	J3-C	Cont. 65	1941	842	806	71	72:40	2,500.00
Weiser Flying Service, Inc., Weiser Municipal Airport, Weiser, Idaho	J5-A	Cont. 75	1940	2783	115	845	115	2,400.00
Greensburg Aviation Corp., Greensburg, Indiana	J5-A	Cont. 75	1940	960	960	960	45	2,350.00
R. E. Lee, P. O. Box 829, Rocky Mount, North Carolina	J5-A	Cont. 75	1941	1295	585	195	44:30	2,350.00
Lambros Seaplane Base, Ridgefield Park, New Jersey	J3-S	Cont. 65	1941	1800	1800	300	300	2,300.00
Davis Bros. Flying Service, Daleville Airport, R. D. 3, Moscow, Pennsylvania	J3	Cont. 65	1946	2	2	2	2	2,295.00
Davis Bros. Flying Service, Daleville Airport, R. D. 3, Moscow, Pennsylvania	J3	Cont. 65	1945	108	108	108	108	2,175.00
United Aviation Corp., Somerset Hills Airport, Basking Ridge, New Jersey	A-75-8	Cont. 75	1940	1107	1107	3	3	2,150.00
Lewis J. Whitley, Concora Airport, Concora, North Carolina	J5-A	Cont. 80	1941	2100	2100	40	40	2,150.00
Millis Air Service, Mendon, Massachusetts	J3-C	Cont. 65	1946	168	168	168	168	2,000.00
Lewis J. Whitley, Concord Airport, Concord, North Carolina	A-75.9	Cont. 75	1941	460	460	60	60	1,975.00
Weimer's Flying Service, Manchester Airport, North Manchester, Indiana	J5	Cont. 65	1940	1303:45	1311:30	230	230	1,975.00
Ravenna Air Service, Meadowview Airport, Ravenna, Ohio	J3	Cont. 65	1946	40	40	40	40	1,975.00
Millis Air Service, Mendon, Massachusetts	J3-C	Cont. 65	1946	385	385	385	385	1,950.00
John L. Coppernoll, Stockton, Illinois	J-3	Cont. 65	1946	100	100	100	100	1,900.00
Bush Aviation Enterprises, Bush Airport, Jeffersonville, Indiana	J3	Cont. 65	1946	10	10	10	10	1,900.00
Francis Rogers, Route 2, Queen City Airpark, Springfield, Missouri	J3-C	Cont. 65	1946	175	175	175	175	1,900.00
United Aviation Corporation, Somerset Hills Airport, Basking Ridge, New Jersey	J3	Cont. 65	1945	234:35	234:35	234:35	234:35	1,875.00
United Aviation Corporation, Somerset Hills Airport, Basking Ridge, New Jersey	J4	Cont. 65	1939	900	900	15	15	1,875.00
Pierce Aviation Company, Municipal Airport, Fort Wayne, Indiana	J3	Cont. 65	1946	531:15	253	531:15	253	1,850.00
Weimer's Flying Service, Manchester Airport, North Manchester, Indiana	J3	Cont. 65	1946	500	500	500	500	1,850.00
United Aviation Corporation, Somerset Hills Airport, Basking Ridge, New Jersey	J3-C	Cont. 65	1946	339:60	339:60	339:60	339:60	1,840.00
United Aviation Corporation, Somerset Hills Airport, Basking Ridge, New Jersey	J3-C	Cont. 65	1945	405:10	379:40	405:10	379:40	1,820.00
Gorss Flying Service, Montgomery Airport, Montgomery, New York	J3	Cont. 65	1946	55	55	55	55	1,800.00
Millis Air Service, Mandon, Massachusetts	J3-C	Cont. 65	1945	745	745	745	745	1,800.00
Davis Bros. Flying Service, Daleville Airport, R. D. 3, Moscow, Pennsylvania	J3	Cont. 65	1943	862	1127	117	375	1,779.00
Greensburg Aviation Corp., Greensburg, Indiana	J3-F	Frank. 65	1941	3250	2825	150	150	1,750.00
Virginia Aircraft Sales Co., Inc., Martinsville, Virginia	J3-C	Cont. 65	1945	480	480	480	480	1,750.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	J4	Cont. 65	1939	450	450	450	50	1,750.00
Ed Gildersleeve, East Northport, Long Island, New York	J4	Cont. 65	1940	325	325	325	60	1,750.00
W. P. Cook, Box 41, Alcoa, Tennessee	J3	Cont. 65	1941	2523	0	3000	0	1,700.00
W. P. Cook, Box 41, Alcoa, Tennessee	J3	Lyc. 65	1940	700	3300	105	105	1,700.00
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	J3	Lyc. 65	1941	3181:45	2682:30	104	83:15	1,695.00
M. R. Hollister, Hamilton Municipal Airport, Hamilton, Texas	J3	Cont. 65	1943	89	89	89	89	1,675.00
B. W. Dudley, Anadarko Airport, Anadarko, Oklahoma	J3-F	65 HP	1941	1102	1102	0	0	1,600.00
Witcher Flying Service, Georgetown Airport, Georgetown, South Carolina	J3	Cont. 65	1946	177	177	177	177	1,595.00
Davis Bros. Flying Service, Daleville Airport, R.D. 3, Moscow, Pennsylvania	J3	Cont. 65	1943	1044	1044	1044	1044	1,556.00
Gate City Airport, Rt. 3, at New Hampshire-Massachusetts State Line, South Nashua, New Hampshire	J3	Lyc. 65	1940	2250	2250	225	475	1,525.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	J3-C	Cont. 65	1940	900	900	100	900	1,500.00
Virginia Aircraft Sales Co., Inc., Martinsville, Virginia	J3-C	Cont. 65	1944	634	634	634	634	1,500.00
Blair County Aviation Co., Altoona Blair County Airport, Martinsburg, Pennsylvania	J3	Frank. 65	1941	980	980	200	0	1,500.00
E. G. Younkin, Anadarko Airport, Anadarko, Oklahoma	J3-F	65 HP	1941	1222	1222	85:50	85:50	1,500.00
Gottschalk Aviation, 402 South Winter Street, Adrian, Michigan	J4-A	Cont. 65	1940	800	75	100	75	1,500.00
Wallace Flying Service, Box 67, Wallace, North Carolina	J3-6	Cont. 65	1941	1800	1800	25	25	1,500.00
Maheu's Airport, Inc., R. F. D. No. 2, Mechanic Falls, Maine	J3	Lyc. 65	1941	3091:30	1730:45	538:45	544:55	1,495.00
Maheu's Airport, Inc., R. F. D. No. 2, Mechanic Falls, Maine	J3	Lyc. 65	1941	3446:15	1870:55	3446:15	676:55	1,495.00

DEALER	MODEL NO.	TYPE ENGINE	YEAR BUILT	TOTAL HOURS		HOURS SINCE LAST MAJOR OVERHAUL		PRICE
				PLANE	ENGINE	PLANE	ENGINE	
Lehigh Aircraft Co., Allentown-Bethlehem Airport, Allentown, Pennsylvania	J3-L	Lyc. 65	1941	500	600	500	600	$1,450.00
Lehigh Aircraft Co., Allentown-Bethlehem Airport, Allentown, Pennsylvania	J3-L	Lyc. 65	1940	500	100	500	100	1,450.00
Gottschalk Aviation, 402 South Winter Street, Adrian, Michigan	J5-A	Cont. 75	1941	200	200	200	200	1,400.00
Millis Air Service, Mendon, Massachusetts	J3	Frank. 65	1940	1300	2034	42	47	1,400.00
Gores Flying Service, Montgomery, New York	J3	Frank. 65	1940	1200	1200	700	256	1,350.00
Lehigh Aircraft Co., Allentown-Bethlehem Airport, Allentown, Pennsylvania	J3-L	Lyc. 65	1940	1000	1000	500	500	1,300.00
Connersville Flying Service, 1404 Conwell Street, Connersville, Indiana	J3	Frank. 65	1940	1600	1600	100	1000	1,300.00
Pierce Aviation Company, Municipal Airport, Fort Wayne, Indiana	J3	Lyc. 65	1940	1894:05	1494:30	1894:05	350	1,250.00
F. E. Macheseney, North Second Street Road, Rockford, Illinois	4705	Cont. 65	1940	3727	2929	335	666	1,250.00
Gottschalk Aviation, 402 South Winter Street, Adrian, Michigan	J3	Cont. 65	1941	3000	3000	100	3000	1,200.00
Wallace Flying Service, Box 67, Wallace, North Carolina	J3-L	Lyc. 65	1939	1200	1200	300	150	1,200.00
Reed Flying Service, P. O. Box 100, Wewoka, Oklahoma	J3-L	Lyc. 65	1941	1500	1500	400	50	1,150.00
Air City Inc., Sturtevant, Wisconsin	J4	Cont. 55	1939	526	545	4:50	4:50	1,100.00
United Aviation Corporation, Somerset Hills Airport, Basking Ridge, New Jersey	J3	Frank. 60	1939	2558:55	1943:32	503:55	392	1,085.00
Ray T. Grant, Grants' Airport, Route No. 2, Quakertown, Pennsylvania	J3-L	Lyc. 55	1939	1937	1647	200	200	1,000.00
PORTERFIELD								
Spartan School of Aeronautics, Municipal Airport, Tulsa, Oklahoma	LP-65	Lyc. 65	1940	1732	1708	1732	1708	1,475.00
REARWIN								
Beacon Flying Service, Inc., Clarence, New York	8135T	Ken Royce 120	1941	1784	1323	0	0	3,950.00
The Coogan Company, 8440 Sunset Boulevard, Hollywood 46, California	8135T	Ken Royce 120	1942	1800	540	0	22	2,950.00
Charles Harris, Jr., Box 365, Versailles, Missouri	7000	Le Blonde 70	1935	1185	1100	1185	1100	1,250.00
RYAN								
Maheu's Airport, Inc., R. F. D. No. 2, Mechanic Falls, Maine	ST-A	Menasco 125	1937	2159	1784:40	82:25	337.45	2,195.00
Neosho Commercial Airport, 210 E. Spring Street, Neosho, Missouri	PT-22	Kinner 165	....	50	50	50	50	1,850.00
Carolina Aero Service, Inc., P. O. Box 57, Anderson, South Carolina	PT-22	Kinner	1941	1366	1100	15	66	1,300.00
STEARMAN								
Wade Flying Services Inc., Bowman Field, Louisville 5, Kentucky	PT-17	Cont. 220	1942	1449	947	1449	649:40	1,485.00
Wade Flying Services Inc., Bowman Field, Louisville 5, Kentucky	PT-17	Cont. 220	1941	1869	887	1869	566	1,200.00
STINSON								
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	AT-19	Lyc. 295	....	40	40	40	40	6,900.00
Pierce Aviation Company, Municipal Airport, Ft. Wayne, Indiana	SR-9B	Lyc. 285	1936	25	25	25	25	6,150.00
Challenger Airlines Inc., 518 Felt Bldg., Salt Lake City, Utah	150	Frank.	1946	95	95	95	95	5,300.00
Jesse J. Klein, 1226 East Oak Park, Des Moines, Iowa	SR-5	Lyc. 245	1935	1020	1020	1020	1020	5,300.00
Timm-Larsen Aircraft Company, Chandler Field, Fresno, California	SM7-B	P & W 400	1931	920	920	35	240	3,995.00
Victory Skypilots Inc., Box 444, Winona Lake, Indiana	10A	Frank. 90	1941	1155:05	1155:05	60	60	3,600.00
Virginia Aircraft Sales Co., Inc., Martinsville, Virginia	10A	Frank. 90	1941	33:30	33:30	33:30	33:30	3,250.00
Dewey Mauk, Box 460, Blackwell, Oklahoma	10A	90	1942	800	790	300	200	3,150.00
Reed Flying Service, Box 100, Wewoka, Oklahoma	L5	Lyc. 190	1945	990	990	120	120	3,000.00
Spartan School of Aeronautics, Municipal Airport, Tulsa, Oklahoma	L5	Lyc. 190	1942	1245	392	1245	392	2,975.00
Pierce Aviation Company, Municipal Airport, Ft. Wayne, Indiana	10A	Frank. 90	1942	90	90	90	90	2,875.00
M. R. Hollister, Hamilton Municipal Airport, Hamilton, Texas	105	80	1939	900	190	900	190	2,600.00
Wenatchee Air Service, Fancher Airport, Wenatchee, Washington	105	Cont. 75	1939	2300	2300	330	330	2,500.00
Timm-Larson Aircraft Company, Chandler Field, Fresno, California	10	Cont. 80	1940	870	730	870	40	2,395.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	105	Cont. 80	1939	1515:25	1515:25	75	163	2,375.00
Francis Rogers, Rt. 2, Queen City Airpark, Springfield, Missouri	10	Cont. 80	1944	835	839:10	5	5	2,250.00
TAYLORCRAFT								
M. R. Hollister, Hamilton Municipal Airport, Hamilton, Texas	BC12-D	Cont. 65	1946	135	135	135	135	2,500.00
Virginia Aircraft Sales Co., Inc., Martinsville, Virginia	2PCLM	Cont. 65	1946	82:05	82:05	82:05	82:05	2,500.00
Wallace Flying Service, Box 67, Wallace, North Carolina	BC12-D	Cont. 65	1946	25	25	25	25	2,500.00
Goods Flying Service, Edna, Texas	BC12-D	Cont. 65	1946	50	50	0	0	2,300.00
Bush Aviation, Bush Airport, Jeffersonville, Indiana	BC12	Cont. 65	1946	375	375	375	375	2,295.00
Francis Rogers, Rt. 2, Queen City Airpark, Springfield, Missouri	BC12	Cont. 65	1946	70	70	70	70	2,250.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	Ace	Cont. 65	1946	11	11	11	11	2,225.00
Farley's Airpark, Box 2, New Baltimore, New York	BC12-D	Cont. 65	1946	20	20	20	20	2,200.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	De Luxe	Cont. 65	1946	253	253	253	253	2,100.00
Howard J. Travis, Muskegon County Airport, Muskegon, Michigan	BC12	Cont. 65	1946	180	180	180	40	2,100.00
Wendell L. Wait, Box No. 2, Midland, Michigan	BC12	Cont. 65	1946	351	351	351	351	2,000.00
Fechter-Brower Air Service, Sutherland, Iowa	BC12	Cont. 65	1941	1100	1100	600	125	2,000.00
Watonga Flying Service, P.O. Box 428, Watonga, Oklahoma	BC65	Cont. 65	1941	1540	41	220	41	1,925.00
Maheu's Airport, Inc., R.F.D. No. 2, Mechanic Falls, Maine	BL65	Lyc. 65	1940	759:25	758:25	198:45	208:15	1,795.00
Watonga Flying Service, P.O. Box 428, Watonga, Oklahoma	DC	A-65-8	1942	2500	360	350	360	1,575.00
Carolina Aero Service, Inc., P.O. Box 57, Anderson, South Carolina	BC	Cont. 65	1939	682	682	169	30	1,500.00
Paul Swaim, Box 199, Eagle Pass, Texas	BL	Lyc. 65	1939	520	520	116	28	1,500.00
Wendell L. Wait, Box No. 2, Midland, Michigan	BC12	Cont. 65	1941	1400	350	200	350	1,500.00
Luther Flying Service, Salix Airport, Salix, Pennsylvania	BC12	Cont. 65	1941	655	655	122	122	1,500.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	DCO	Cont. 65	1944	1199	893	110	110	1,425.00
Goods Flying Service, Edna, Texas	L2-B	Cont. 65	1943	675	456	100	180	1,395.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	DCO	Cont. 65	1943	1668	1249	400	200	1,350.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	DCO	Cont. 65	1943	1355	857	400	175	1,250.00
Culver Flying Service, Inc., Municipal Airport, Evansville, Indiana	L2-M	Cont. 65	1943	435	435	185	90	1,175.00
Dewey Mauk, Box 460, Blackwell, Oklahoma	BL50	Lyc.	1939	1300	900	340	125	1,150.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	DCO	Cont. 65	1943	1657	1211	657	211	1,000.00
Ralph N. Smeck, Ohio University Airport, Athens, Ohio	DCO	Cont. 65	1943	1450	1200	425	220	1,000.00
French Aero Service, Washington Airpark, Washington, C. H. Ohio	A40	Cont. 40	1939	800	800	800	28	895.00
VULTEE								
Lambros Seaplane Base, Ridgefield Park, New Jersey	SNJ-3	P & W 550	1943	1100	1800	9	9	2,500.00
Farley's Airpark, Box 72, New Baltimore, New York	13	P & W 450	1944	175	175	175	175	1,800.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	SNV-2	P & W 450	1944	767	767	767	167:15	1,650.00
Echelon Aeronautical Service, Box 104, Haddonfield, New Jersey	BT-13A	P & W 450	1943	2180	1775	85	85	1,650.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	SNV-2	P & W 450	1944	746	746	746	151	1,650.00
Blair County Aviation Co., Martinsburg, Pennsylvania	BT-13	P & W 450	1942	1200	850	1200	310	1,200.00
Carolina Aero Service, Inc., P.O. Box 57, Anderson, South Carolina	BT-13A	P & W 450	1942	934	934	934	9550	1,150.00
Edward E. Burks, Hillcrest Ave., Columbia, Tennessee	BT-13A	P & W 450	1943	1726:10	1726:10	1:30	94:40	1,125.00
St. Louis Flying Service, Kratz Field, St. Louis, Missouri	BT-15	Wright 440	1941	476	476	476	10	975.00
WACO								
Burlington Flying Service, Airport, Burlington, Vermont	EQC-6	Wright 350	1936	2700	2700	100	100	8,500.00
Luther Flying Service, Salix Airport, Salix, Pennsylvania	ZQC-7	Jacobs 285	1937	1355	1355	361	361	5,900.00
W. P. Cook, Box 41, Alcoa, Tennessee	UIC	Cont. 220	1935	979	1254	54	254	3,900.00
E. O. Champion Air Service, Oxford, Mississippi	ASO	Wright 200	1928	700	700	30	30	2,000.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	UPF-7	Cont. 220	1941	744	744	744	360	1,350.00
Fred Bartholomew Aviation Sales, 2207 Croydon Court, Oklahoma City, Oklahoma	UPF-7	Cont. 220	1940	949	957	949	113	1,350.00

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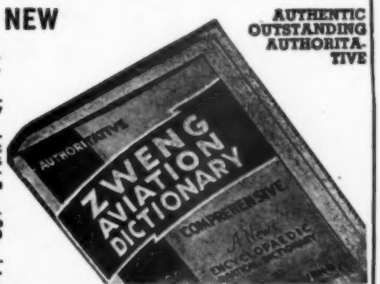

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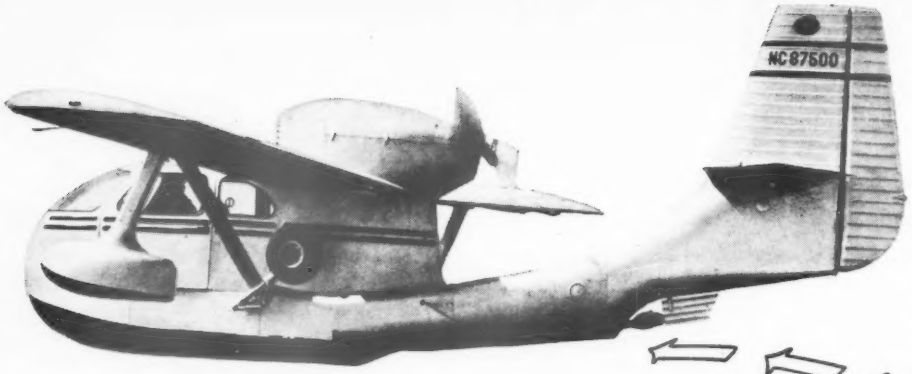

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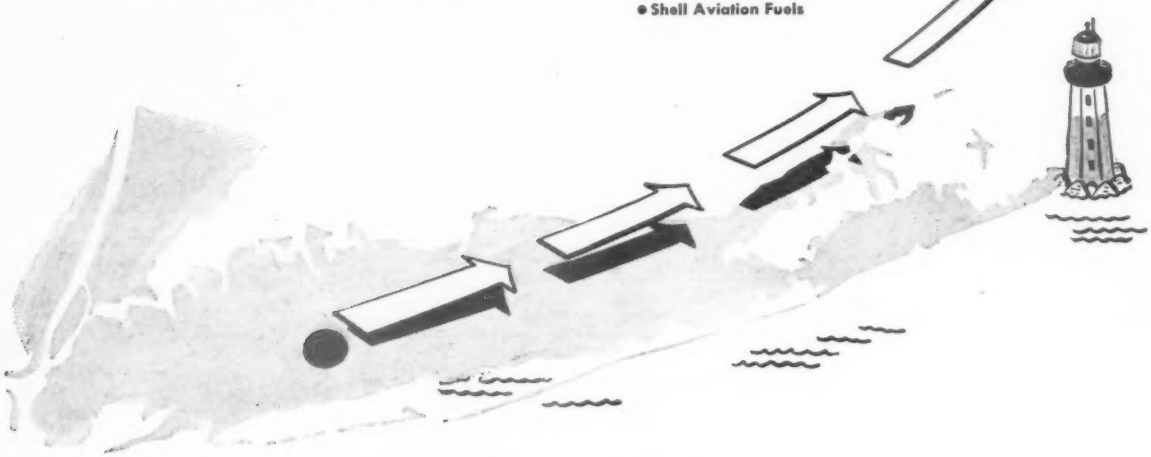

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